Connecticut Department of Transportation

2022-2025

Transit Asset Management Group Plan

Tier II Plan in accordance with 49 CFR §625.5

HARTransit
VTD
gbt Greater Bridgeport Transit
Windham Region Transit District WRTD
SEAT Southeast Area Transit District
Milford Transit District
9 Town Transit
Northeastern Connecticut Transit District
Norwalk Transit District
MAT
Northwestern CT Transit District

September 2022

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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
2800 BERLIN TURNPIKE, P.O. BOX 317546
NEWINGTON, CONNECTICUT 06131-7546

Office of the Commissioner

September 30, 2022

Mr. Peter Butler, Acting Regional Administrator
U. S. Department of Transportation
Federal Transit Administration
Kendall Square
55 Broadway, Suite 920
Cambridge, MA 02142-1093

Dear Mr. Butler:

Subject: Notification of Compliance with 49 CFR 625
Transit Asset Management Rule
2022 Public Transportation Transit Asset Management Plan (Tier 1 Providers)
2022 Transit Asset Management Group Plan (Tier 2 Providers)

The Connecticut Department of Transportation (Department) has completed update of the Transit Asset Management Plans (TAMPs) for Tier 1 and Tier 2 Providers to comply with the Federal Transit Administration's (FTA's) deadline of September 30, 2022.

Both TAMPs include updates for State of Good Repair (SGR) performance goals that pertain to FTA's SGR measures for revenue vehicles, service vehicles, rail guideway and facility asset classes, as well as progress on key TAM implementation activities since 2018.

TAMPs will be shared with Connecticut's eight Metropolitan Planning Organizations for inclusion into their amended Metropolitan Transportation Plans.

Should you have any questions, please contact Ms. Sharon Okoye, Public Transportation Asset Management Lead, at Sharon.Okoye@ct.gov.

Sincerely,

Joseph J. Giulietti

Digitally signed by Joseph J. Giulietti
DN: CN=Joseph J. Giulietti, E=joseph.giulietti@ct.gov, O=CT DOT, OU=Commissioner's Office, CN=Joseph J. Giulietti
Date: 2022.09.27 19:31:10-04'00'

Joseph J. Giulietti
Commissioner

cc: Mr. Matthew Keamy, FTA Program Management Office
Transit Districts
Town of Mansfield, Mashantucket Pequot Nation

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Message from the Commissioner

As Commissioner of the Connecticut Department of Transportation, I am pleased to present the 2022 Public Transportation Transit Asset Management Plan. This plan demonstrates a continued strong commitment toward achieving a State of Good Repair for all aspects of our transportation system.

Connecticut's multimodal transportation system supports state, local and regional economies by enabling the efficient movement of people, goods, and services. Connecticut's transportation system provides an important link between northern New England and New York, New Jersey and the Mid-Atlantic states. The transportation system also links our communities by connecting our neighborhoods, towns, and cities. In order for Connecticut's economy to function properly and continue to grow, the transportation system needs continued and consistent investment. The Connecticut Department of Transportation remains committed to keeping the state moving. Despite the many challenges posed by the COVID-19 pandemic in recent years, construction was never shut down, State of Good Repair projects continued to move forward, and technology allowed the workforce to adapt and innovate.

This Group Transit Asset Management Plan has been created and is consistently updated in partnership with Connecticut's Tier II service providers, to achieve a systematic and comprehensive asset management system for the State's public transportation assets to provide safe and reliable service for the citizens of Connecticut.

The Department continues to make significant progress in advancing the condition of our transportation system, especially with the increase in funding provided by the Bipartisan Infrastructure Law. Implementation of this plan aligns well with the Department's priority to maintain and preserve the transportation system.

Joseph J. Giulietti

Commissioner

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Disclaimer

The Connecticut Department of Transportation (CTDOT) has prepared this Transit Asset Management Plan (TAMP) in accordance with 49 CFR 625.5 and pursuant to the further guidance and direction of the Federal Transit Administration. The TAMP presented here is our plan to ultimately achieve a systematic and comprehensive asset management system for Connecticut's public transportation assets.

In some cases asset condition reported herein are based on professional judgement in the absence of technical data.

CTDOT will continue to perform inspections of its public transportation assets and will further update the TAMP periodically. Future TAMP updates will revise investment recommendations as the asset condition data requires.

For further information or questions about this document, please contact Sharon Okoye at 860-594-2367 or Sharon.Okoye@ct.gov.

Connecticut Department of Transportation

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Connecticut Department of Transportation
Transit Asset Management Group Plan

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List of Acronyms

AIM	Asset Inventory Module
ARSA	Amended and Restated Service Agreement
BIL	Bipartisan Infrastructure Law
CPI	Consumer Price Index
CSS	Context-Sensitive Solutions
CTDOT	Connecticut Department of Transportation
ETD	Estuary Transit District
FAST	Fixing America's Surface Transportation
FHWA	Federal Highway Administration
FMS	Facilities Management Solution
FTA	Federal Transit Administration
GBTA	Greater Bridgeport Transit
GNHTD	Greater New Haven Transit District
Group-TAMP	Transit Asset Management Group Plan
HARTransit	Housatonic Area Regional Transit
IIJA	Infrastructure Investment & Jobs Act
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
LCP	Life Cycle Planning
MAP-21	Moving Ahead for Progress in the 21st Century
MAT	Middletown Area Transit District
MDBF	Mean Distance Between Failures
MTD	Milford Transit District
MPO	Metropolitan Planning Organization
NECTD	Northeastern Connecticut Transit District

NTD	National Transit Database
NWCTD	Northwestern Connecticut Transit District
NWLKTD	Norwalk Transit District
PT-TAMP	Public Transportation Transit Asset Management Plan
PI	Prioritization Index
ROW	Right-of-Way
SEAT	Southeast Area Transit District
SGR	State of Good Repair
SQL	Structured Query Language
STIP	Statewide Transportation Improvement Program
TAM	Transit Asset Management
TAPT	Transit Asset Prioritization Tool
TCRP	Transit Cooperative Research Program
TERM	Transit Economic Requirements Model
ULB	Useful Life Benchmark
VTD	Valley Transit District
WRTD	Windham Region Transit District

Chapter 1
Introduction

The Connecticut Department of Transportation is the sponsoring agency for the development of this Transit Asset Management Group Plan. The plan documents asset management processes and policies for Tier II transit providers in Connecticut, summarizes the inventory and condition of transit assets, and prioritizes state of good repair investments. This document is designed to meet Federal Transit Administration's TAM requirements, and builds on past practices and accomplishments in maintaining Connecticut's transportation infrastructure while also emphasizing the importance of implementing a plan to maintain our infrastructure today and in the future.

Welcome

Transit asset management (TAM) is a strategic and systematic process of taking care of assets, with a focus on both engineering and economics and is based upon collection of quality data. The TAM process identifies a structured sequence of work to better maintain transit capital assets in a State of Good Repair (SGR) over their lifecycle at a minimum cost.

In Connecticut, the practices of asset management are needed to address the condition of our infrastructure as many of our assets have aged beyond their intended life expectancy. This aging infrastructure combined with increased demands on the transportation network and limited funding strongly substantiates the need to implement asset management practices.

The Connecticut Department of Transportation (CTDOT) is the sponsoring agency for the creation of this Transit Asset Management Group Plan (Group-TAMP) for Connecticut's small transit providers. The Group-TAMP summarizes transit assets in Connecticut, lays out existing asset management processes, and identifies priority SGR investments.

A separate document has been developed for the Tier I service providers in Connecticut which includes the three modes of bus, rail and ferry.

Federal Requirements

Federal regulations initiated by Moving Ahead for Progress in the 21st Century (MAP-21) and the Fixing America's Surface Transportation (FAST Act) require that recipients and subrecipients of federal financial assistance develop TAM plans.

Transit providers may be required to either develop their own TAM plan or participate in a group TAM plan depending on whether they are Tier I or Tier II. In 49 CFR 625.5, the Federal Transit Administration (FTA) defines Tier I and Tier II providers:

- *Tier I provider* means a recipient that owns, operates, or manages either (1) one hundred and one (101) or more vehicles in revenue service during peak regular service across all fixed route modes or in any one non-fixed route mode, or (2) rail transit.
- Tier II provider means a recipient that owns, operates, or manages (1) one hundred (100) or fewer vehicles in revenue service during peak regular service across all non-rail fixed route modes or in any one non-fixed route mode, (2) a subrecipient under the 5311 Rural Area Formula Program, (3) or any American Indian tribe.

Each provider, Tier I or Tier II, must designate an accountable executive who is responsible for accepting and approving the group TAM plan and SGR targets.

A group TAM plan must include a list of participants in the plan. The sponsor must coordinate development of a group TAM plan with each participant's accountable executive and must make the completed plan available to all participants.

A group TAM plan must cover a period of four years. The initial group TAM plan was required to be completed by October 1, 2018, and the plan must be updated every four years.

Tier 1 and Group Plan Requirements

A sponsor must develop a Group TAM plan for Tier II transit providers, while Tier I providers must develop their own TAM plans. Tier II providers may also choose to forgo the Group TAM plan and develop individual plans. A Tier I TAM plan must include the following nine elements, while a Group plan must include only elements 1 thru 4:

1. **Capital asset inventory**
2. **Condition assessment**
3. **Description of analytical processes or decision support tools**
4. **Investment prioritization**
5. **TAM and SGR policy**
6. **TAM plan implementation strategy**
7. **Key TAM activities**
8. **List of resources to implement the plan**
9. **Outline of how a provider will monitor, update, and evaluate the plan**

Tier II Transit Providers in Connecticut

CTDOT owns the local bus systems in Hartford, New Haven, Stamford, Waterbury, New Britain, Bristol, Meriden and Wallingford, and operates them under the CT*transit* brand name.

In non-CT*transit* service areas, local transit districts were created to assume operation of bus services. The local districts provide bus transit services under the direction of local Boards of Directors representing the member towns. CTDOT enters into transit operating assistance contracts with the districts to cover operating deficits up to a predetermined budget amount. Some municipalities do provide some financial support to these transit districts but the state supports about 90% of the deficit funding in the urban systems, and the state and federal government provide 83% of the deficit funding in the rural systems.

Group-TAMP Transit Providers in Connecticut

Twelve of the fourteen transit districts in Connecticut are represented in this Group-TAMP. Greater Hartford Transit District is considered a Tier 1 provider and is developing its own Tier 1 TAM Plan. Greater Waterbury Transit District does not operate transit service and is not included in this plan.

In addition to the transit districts, the Group-TAMP includes subrecipients of the 5310 Program, Town of Mansfield and the Mashantucket Pequot Tribal Nation. The twelve districts, Town of Mansfield, and Mashantucket Pequot Tribal Nation are listed in Table 1-1.

The following are descriptions of the participating Tier II transit provider's service areas for their member Towns.

Transit Districts

Greater Bridgeport Transit Authority

www.gogbt.com

The Greater Bridgeport Transit Authority (GBTA) serves the cities of Bridgeport, Fairfield, Stratford, and Trumbull. Fixed route bus service and ADA paratransit service are provided 7 days a week.

Estuary Transit District d.b.a. 9 Town Transit

www.9towntransit.com

The Estuary Transit District (ETD) serves Chester, Clinton, Deep River, Durham, Essex, East Haddam, Haddam, Killingworth, Lyme, Old Lyme, Old Saybrook and Westbrook. The district provides demand response and flexible fixed route services throughout the region with its 9 Town Transit bus services. Connections are made in Madison, Middletown and New London to neighboring bus services.

Note that ETD and Middletown Area Transit District merged as of July 1, 2022. As the data for this TAMP was collected prior to that date, this TAMP treats the two districts as separate. Future TAMPs will reflect the merging of the districts.

Greater New Haven Transit District

www.gnhtd.org

Greater New Haven Transit District (GNHTD) provides complementary ADA service, under contract to CTDOT, to the New Haven area, including Branford, East Haven, Hamden, New Haven, North Branford, North Haven, Orange, West Haven, Woodbridge, as well as more limited service to Ansonia, Cheshire, Guilford, Madison, Seymour, Shelton, Wallingford and Waterbury. In addition the District provides Regional Rides Program, which is an integrated elderly/disabled program available to residents of eleven towns in the New Haven region. Transportation is offered 7 days a week.

Housatonic Area Regional Transit

www.hartransit.com

Housatonic Area Regional Transit (HARTransit), operating 14 fixed routes, has a core service area comprised of

Bethel, Brookfield, Danbury and New Milford, with connecting services to southern CT and to the MTA Harlem Line that include the communities of New Fairfield, Norwalk, Redding, Ridgefield and Wilton in CT and Lewisboro, Katonah, Brewster and Southeast in NY. HARTransit directly operates its complementary ADA paratransit service as well as an extensive regional senior/disabled dial-a-ride. Full service operates Monday-Friday; 10 routes run on Saturday and 3 on Sunday.

Middletown Area Transit District

www.middletownareatransit.org

The Middletown Transit District (MAT) operates urban and rural fixed route service as well as senior/disabled paratransit services in five towns including Portland, East Hampton, Middlefield, Durham and Middletown. Fixed route bus service operates 6 days a week, Monday through Saturday.

Note that ETD and MAT merged as of July 1, 2022. As the data for this TAMP was collected prior to that date, this TAMP treats the two districts as separate. Future TAMPs will reflect the merging of the districts.

Milford Transit District

www.milfordtransit.com

Milford Transit District (MTD) serves the city of Milford with fixed route bus service and ADA van service. There are four local routes, operating Monday through Saturday, and one bus route connecting Milford to Norwalk as part of the Coastal Link, which operates 7 days a week. The ADA van service also travels to Greater New Haven and Greater Bridgeport, and operates 7 days a week.

Northeastern Connecticut Transit District

www.nectd.org

The Northeastern Connecticut Transit District (NECTD) provides deviated fixed route service (Monday through Sunday) for Brooklyn, Killingly, Putnam and Thompson. NECTD further provides point-to-point services for elderly and disabled persons though the Municipal Grant Program for Brooklyn, Canterbury, Eastford, Hampton, Killingly,

Plainfield, Pomfret, Putnam, Sterling, Thompson, Voluntown and Woodstock.

Northwestern Connecticut Transit District (NWCTD)

www.nw*CTtransit*.com

Northwestern Connecticut Transit District (NWCTD) provides service in Torrington, Harwinton, Winchester, Litchfield, Morris, Kent, Sharon, Falls Village, Colebrook, Goshen, Salisbury, Norfolk, New Hartford, Cornwall, Canaan, and Barkhamsted. Service operates over 5 fixed routes Monday through Friday and on 1 route Saturdays. Paratransit service for all towns, seniors ride for a suggested donation.

Norwalk Transit District

www.norwalktransit.com

The Norwalk Transit District (NTD) services the communities of Norwalk, Westport, Wilton, Greenwich, and via the Coastal link to Fairfield, Bridgeport, Stratford, and Milford. Fixed routes for bus service on 23 routes operate Monday through Saturday, and Coastal Link service runs on Sunday. Norwalk Transit District provides local and inter-town door-to-door services for the disabled in seven towns, complementary ADA service in Westport and Norwalk, and under contract to CTDOT, complementary ADA service in Stamford, Darien, and Greenwich.

Southeast Area Transit District

www.seatbus.com

Southeast Area Transit District (SEAT) provides fixed route service Monday through Saturday over 17 routes to nine towns, including Norwich, New London, Groton, Waterford, East Lyme, Lisbon, Griswold, Montville and Stonington as well as Foxwoods and Mohegan Sun. The District also operates MicroTransit service in Stonington and a MicroTransit pilot project in New London. SEAT connects to AMTRAK and ferry services in New London and to neighboring bus services in New London, Lisbon and Norwich. Complementary ADA paratransit service is

provided under contract through Eastern Connecticut Transportation Consortium.

Valley Transit District

www.valleytransit.org

Valley Transit District (VTD) provides Dial-a-Ride and complimentary ADA paratransit service to the towns of Ansonia, Derby, Seymour, and Shelton. Rides are available Monday through Friday between 6 a.m. and 5 p.m. The Valley Transit District offers the Bridgeport Avenue Commuter Connection. This service connects riders of GBTA (Route 15) and CTTRANSIT New Haven division (255) to employers along the Bridgeport Avenue corridor in Shelton.

Windham Region Transit District (WRTD)

www.wrtd.net

Windham Region Transit District (WRTD) operates fixed route rural bus service in Mansfield and Windham Monday through Saturday, and demand-response service in Ashford, Chaplin, Columbia, Coventry, Hampton, Lebanon, Mansfield, Scotland, Willington, and Windham. Complementary ADA paratransit service throughout 10 towns is contracted.

5310 Program and Other Participating Transit Providers

Enhanced Mobility for Seniors and Individuals with Disabilities. The Section 5310 grant program is open to private nonprofit organizations, states or local government authorities, and operators of public transportation. CTDOT conducts a competitive selection process for the Section 5310 grant program. Each year, application materials are made available to eligible recipients, which are reviewed and prioritized for award by CTDOT and the Regional Council of Governments.

CTDOTs 5310 grant program funds 155 cutaway vehicles operating “Open Door” transportation services throughout 54 Towns and or nonprofit organizations. The list of 5310 subrecipients is included in Appendix A.

Town of Mansfield

http://www.mansfieldct.gov/TransportationCenter

The Town owns and operates the Nash-Zimmer Transportation Center. The Nash-Zimmer Transportation Center serves as a central transportation hub for UConn, Windham Region Transit District, CT*transit* and inter-city bus systems including Peter Pan. The Center is the Town of Mansfield's transportation hub where residents and visitors can catch a bus, store their bike or park their car. The facility is located adjacent to the Downtown Storrs parking garage at 23 Royce Circle, Storrs Mansfield, CT and operates Monday through Friday 7AM to 7PM, and Saturday 10AM to 6PM.

Mashantucket Pequot Tribal Nation

https://www.mptn-nsn.gov/CommunityBus.aspx

The Mashantucket Pequot Tribal Nation opted to participate in the CTDOT Group-TAMP through recommendation from the FTA's Region 1 office. Mashantucket Pequot Tribal Nation is an American Indian tribe in Connecticut and as per 49 CFR 625.5 is a Tier II provider.

Mashantucket Pequot Tribal Nation owns nine revenue vehicles and additionally provides transportation service through twenty-five vehicles owned and operated by Foxwoods Casino. Bus Service is provided at sixteen bus stop locations on the Reservation to Foxwoods Casino.

Table 1-1. Group-TAMP Participants and Accountable Executives

Transit Provider	Accountable Executive
Greater Bridgeport Transit Authority	Doug Holcomb, General Manager/CEO
The Estuary Transit District	Joseph Comerford, Executive Director
Greater New Haven Transit District	Mario Marrero, Executive Director
Housatonic Area Regional Transit District	Rick Schreiner, CEO
Middletown Transit District	Joseph Comerford, Executive Director
Milford Transit District	Henry Jadach, Executive Director
Northeastern Connecticut Transit District	John Filchak, Executive Director

Transit Provider	Accountable Executive
Northwestern Connecticut District	Brian Kalosky, Executive Director
Norwalk Transit District	Matt Pentz, CFO
Southeast Area Transit District	Michael Carroll, General Manager
Valley Transit District	Mark Pandolfi, Executive Director
Windham Region Transit District	Linda Hapeman, Executive Director
Town of Mansfield	Cynthia van Zelm, Executive Director Mansfield Downtown Partnership
Mashantucket Pequot Tribal Nation	Kevin Gove, Public Works Executive Director

Appendix B includes Group-TAMP approval documentation from all accountable executives in this plan.

Agency Structure Regarding TAM

CTDOT is the sponsor of this Group-TAMP and also developed its own Tier I TAM plan. Each transit district was able to participate in a series of working group meetings coordinated by CTDOT to develop the Group-TAMP.

CTDOT has a Transportation Asset Management Group which develops the highway and transit TAMPs. The Transit Asset Management Lead is responsible for preparing the Tier I and Tier II TAM Plans, collaborating with contracted transit providers for National Transit Database (NTD) reporting requirements and coordinating with the agency lead for future development of CTDOT's multimodal TAM plan. The current CTDOT structure for TAM is presented in Figure 1-1.

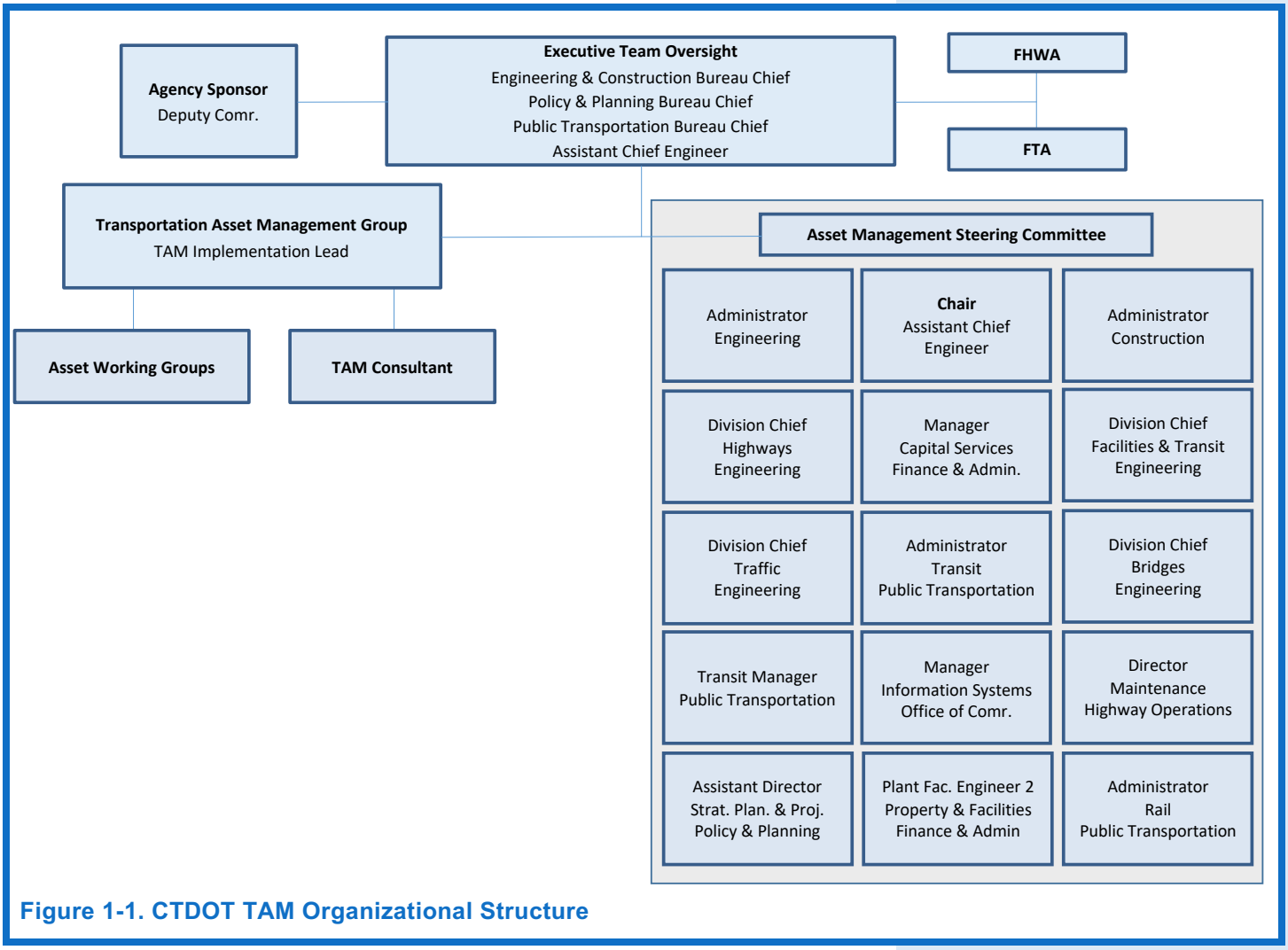

Figure 1-1. CTDOT TAM Organizational Structure

Group-TAMP

Purpose of the Group-TAMP

The Group-TAMP is a federally-required document intended to document TAM practices and processes at Tier II transit providers in Connecticut. The Group-TAMP will help transit providers manage transit assets to enhance safety, reduce maintenance costs, increase reliability, and improve performance. TAM will help transit providers maintain the transportation system in SGR with the most efficient use of financial resources.

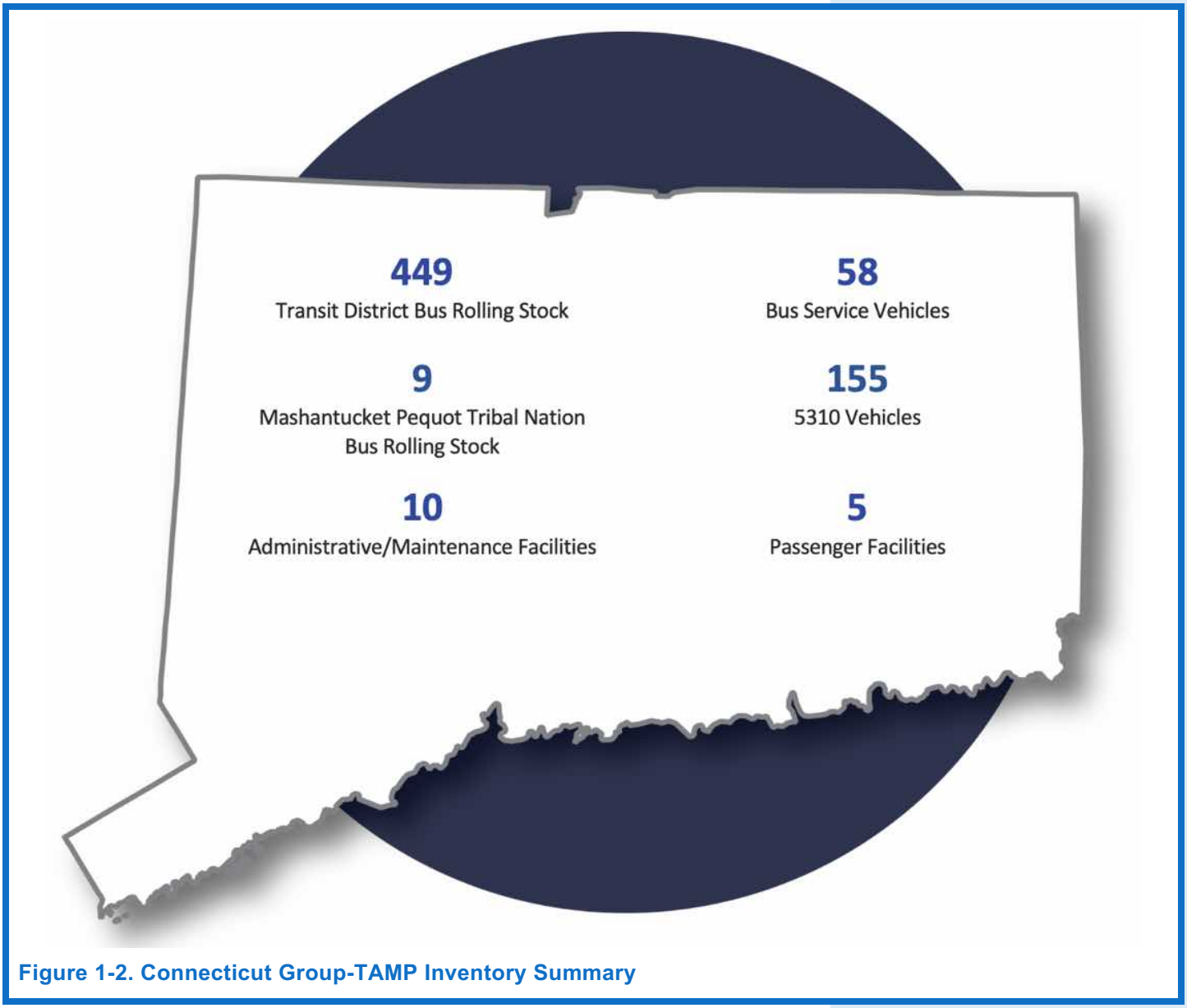

Figure 1-2. Connecticut Group-TAMP Inventory Summary

Scope of the Group-TAMP

This is a Group-TAMP for Tier II providers, sponsored by CTDOT. The Tier II providers in this Group-TAMP have assets in three of the four categories defined by FTA: rolling stock, equipment, and facilities. A summary of transit assets in this plan is shown in Figure 1-2.

Awareness of other CTDOT plans, such as those listed at right, is important for context and alignment with the Group-TAMP.

Group-TAMP Update Process

The Group-TAMP update process began in May 2021 and involved twelve Connecticut transit districts and CTDOT.

CTDOT formed a working group of relevant staff for the Group-TAMP, including representatives from the transit districts. The working group supported the development of the Group-TAMP and met periodically to review and provide feedback on the Group-TAMP development process.

Asset fact sheets have been developed as part of the Group-TAMP building process to provide quick reference summaries for each asset highlighting the asset's inventory and condition, targets, and needs. The fact sheets are included in Appendix C.

5310 participants were surveyed for validation of "open door" service requirements by FTA for participation. Inventory data of 5310 assets used in the provision of "open door" service was supplied by the 5310 participants and validated by the PT TAM Unit.

The Town of Mansfield and Mashantucket Pequot Tribal Nation were added to the Group-TAMP and supplied the inventory and condition data for their transit assets. As CTDOT moves forward with TAM implementation, support and participation from all Group Plan participants will be essential. This Group-TAMP is a living document that will be reviewed and updated every four years.

List of CTDOT Plans

- Transportation Infrastructure Capital Plan Report, 2022-2026
- Statewide Transportation Improvement Program
- Statewide Long-Range Transportation Plan
- Strategic Highway Safety Plan
- State Freight Plan
- State Rail Plan
- Connecticut Active Transportation Plan
- CTDOT Highway TAMP
- CTDOT Americans with Disabilities Act (ADA) Transition Plan
- State Plan of Conservation and Development

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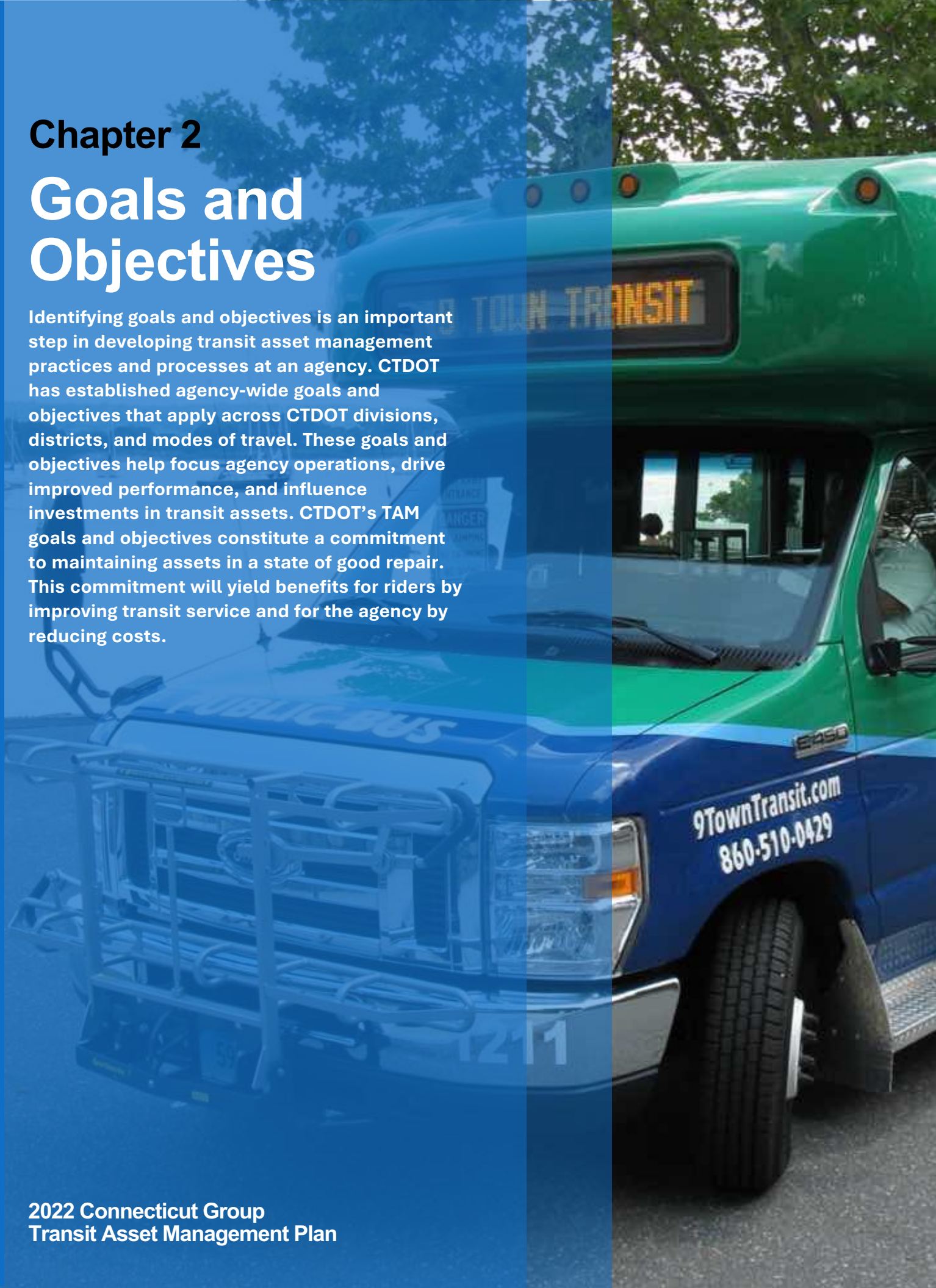
Chapter 2

Goals and Objectives

Identifying goals and objectives is an important step in developing transit asset management practices and processes at an agency. CTDOT has established agency-wide goals and objectives that apply across CTDOT divisions, districts, and modes of travel. These goals and objectives help focus agency operations, drive improved performance, and influence investments in transit assets. CTDOT's TAM goals and objectives constitute a commitment to maintaining assets in a state of good repair. This commitment will yield benefits for riders by improving transit service and for the agency by reducing costs.



Overview

As indicated by their participation in this Group-TAMP, the Tier II transit providers in Connecticut are committed to the same goals and objectives as CTDOT. Separately from this Group-TAMP, each provider has developed specific facility and vehicle management plans which detail their policies and practices for managing those assets.

CTDOT's mission and vision are guiding principles that shape TAM policy and transit goals and objectives. Goals and objectives help define and guide the TAM program at CTDOT and are an integral part of the Group-TAMP. Goals are broad statements of ideas to reach a desired outcome or ideal state of the transit system in Connecticut. Objectives should be SMART: specific, measurable, achievable, realistic, and timely steps that will help make progress towards attaining those goals. This chapter presents CTDOT's mission, vision, and goals and objectives. The chapter also defines SGR and lays out CTDOT's TAM policy.

Federal Requirements

FTA defines TAM policy as "a transit provider's documented commitment to achieving and maintaining SGR for all of its capital assets. The TAM policy defines the transit provider's TAM objectives and defines and assigns roles and responsibilities for meeting those objectives."

SGR is defined by FTA as "the condition in which a capital asset is able to operate at a full level of performance." The FTA final rule on transit asset management further defines SGR in §625.41:

> "A capital asset is in a state of good repair if it meets the following objective standards:
>
> - The capital asset is able to perform its designed function
> - The use of the asset in its current condition does not pose an identified unacceptable safety risk
> - The life-cycle investment needs of the asset have been met or recovered, including all scheduled maintenance, rehabilitation, and replacements."

State of Good Repair

The condition in which a capital asset is able to operate at a full level of performance.

Note that FTA does not require TAM and SGR policy for Group TAMPs, but does require Tier 1 providers to define a TAM and SGR policy.

Goals and Objectives

The highest-level guiding principles at CTDOT are the vision and mission. These principles influence transportation goals and objectives across the state. Tier II transit providers support these goals and objectives.

Vision and Mission

Connecticut strives to achieve a nationally competitive transportation system that is multi-modal, resilient, and long-lasting; addresses capacity issues; and helps the economy.

CTDOT Vision & Mission

CTDOT's vision is to lead, inspire, and motivate a progressive, responsive team, striving to exceed customer expectations.

CTDOT's mission is to provide a safe and efficient intermodal transportation network that improves the quality of life and promotes economic vitality for the State and the region.

CTDOT's Bureau of Public Transportation has its own mission which closely aligns with the overall CTDOT mission.

Bureau of Public Transportation Mission

The **mission** of the **Bureau of Public Transportation** is for the development, maintenance, and operation of a safe and efficient system of motor carrier, rail facilities and maritime assets for the movement of people and goods, such as Bus Transit, Rail Operations, Ferries, State Pier Facilities and Ridesharing programs.

CTDOT Values

- **Measurable results**
- **Customer service**
- **Quality of life**
- **Accountability & integrity**
- **Excellence**

CTDOT's vision and mission are further detailed in the 2018 Long-Range Transportation Plan (LRTP) vision.

Long-Range Transportation Plan Vision

- The economy is strong because improved and sustained multimodal and intermodal transportation contribute to an environment in which businesses and people thrive.
- Travel is safe and high safety standards are sustained on all modes of transport.
- Transportation infrastructure is in a state of good repair.
- Transportation services provide efficient mobility for people and goods, both within and beyond state borders.
- Congestion is managed.
- The natural environment is protected, air quality is good, and energy is conserved.
- Urban, suburban, and rural centers are transformed into livable communities that provide opportunities for walking and bicycling and are enhanced by accessible transportation systems.

CTDOT views maintaining condition of its transportation infrastructure as critical to its mission. One of the key goals in the LRTP is:

- Infrastructure in a state of good repair to improve reliability and reduce costs to users.

Maintaining asset condition also supports other goals mentioned in the LRTP, including:

- Economic growth with efficient and effective transportation for people and goods
- Safe and secure travel for people and goods for all modes
- Resilient transportation systems

Maintaining transit assets in a SGR helps support CTDOT goals and TAM objectives. In addition to CTDOT's vision, mission, and LRTP goals, the agency has devoted particular attention to pursing TAM policy and practices.

Long-Range Transportation Plan

CTDOT's federally required LRTP covers years 2018-2050 and serves as a framework for near- and long-term transportation decision making. The plan encourages performance-based planning and programming and supports the implementation of TAM at CTDOT.

Summary of TAM Objectives

CTDOT has adopted a set of TAM objectives that are aligned with the vision and mission of the agency. These objectives are helping to steer CTDOT as it develops, refines, and implements TAM policies, processes, and practices. Tier II transit providers added to the list of TAM objectives at a TAM workshop during the first Group-TAMP development process.

TAM Objectives

- Attain the best asset conditions achievable, given available resources
- Deliver an efficient and effective asset management program that preserves, expands, and modernizes the state's transportation infrastructure
- Enhance communications and ensure transparency about capital programming prioritization and investment decisions
- Achieve and maintain compliance with federal asset management rules
- Maintain federal and state funded assets in SGR
- Ensure safety of customers through asset management
- Pursue other funding sources to sustain CTDOT's TAM program

Applied to transit assets, the above goals and objectives translate into a commitment to make investments, where possible, to achieve and maintain a SGR for transit assets. These assets include revenue vehicles, equipment and facilities. Asset inventory and condition are described in Chapter 3 Inventory and Condition.

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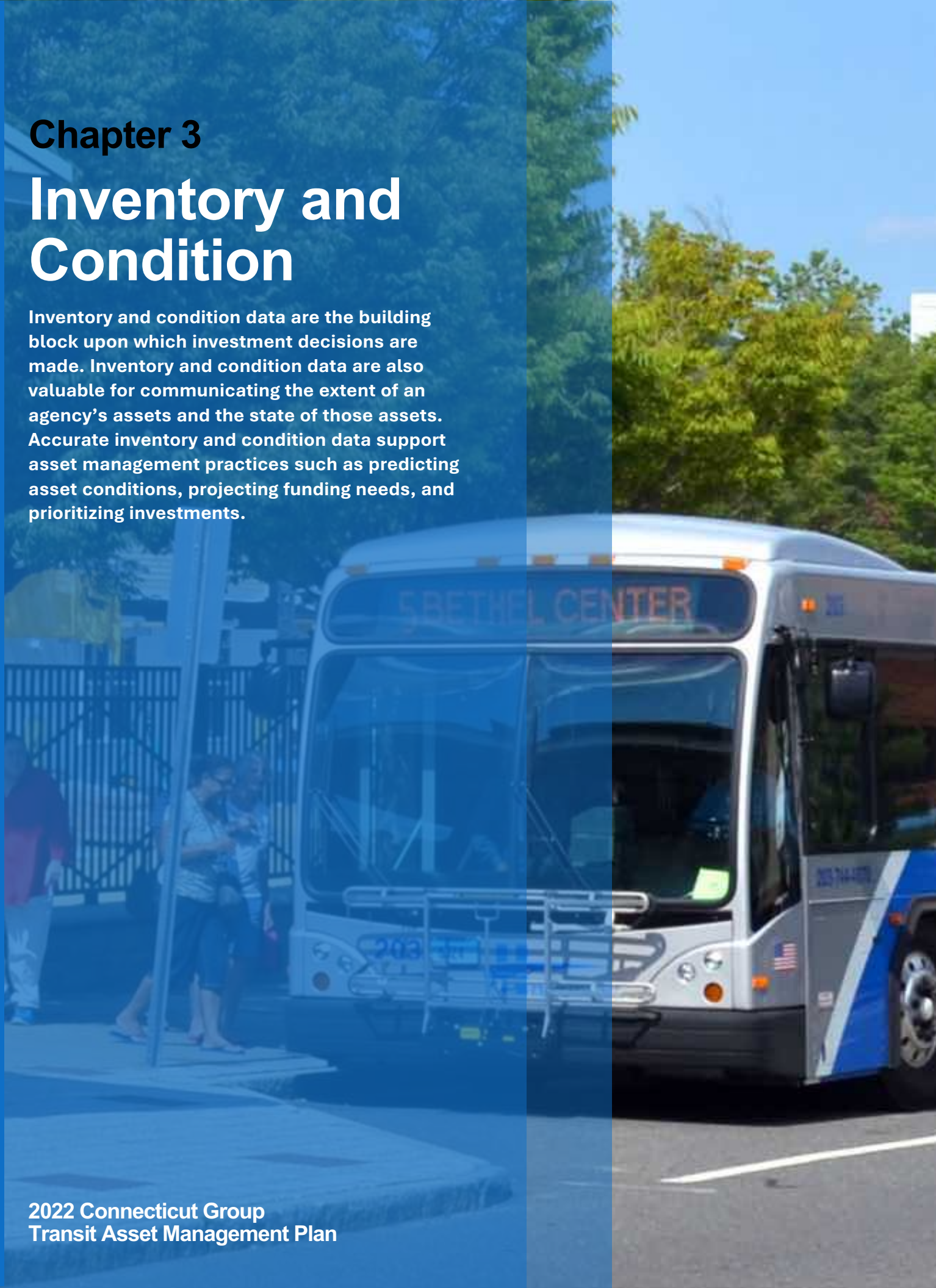
Chapter 3

Inventory and Condition

Inventory and condition data are the building block upon which investment decisions are made. Inventory and condition data are also valuable for communicating the extent of an agency's assets and the state of those assets. Accurate inventory and condition data support asset management practices such as predicting asset conditions, projecting funding needs, and prioritizing investments.



Overview

This chapter presents a summary of transit asset inventory and condition for Connecticut Group-TAMP participants. This Group-TAMP addresses bus rolling stock; equipment; and bus facilities.

Federal Requirements

FTA requires that Group-TAMP include an inventory and condition assessment of all capital assets for which the provider has direct capital responsibility. The inventory and condition assessment must be at a level of detail sufficient to model asset condition and support investment prioritization.

As part of the TAM plan rule, transit providers are also required to set performance targets for performance measures defined by FTA in 49 CFR §625.43. These are listed below.

FTA SGR Performance Measures for Capital Assets

- **Rolling Stock:** The performance measure for rolling stock is the percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark (ULB). ULB is maximum age of an asset based on operational characteristics (age, mileage, environment) before it is replaced or enters into SGR backlog.
- **Equipment:** The performance measure for non-revenue, support-service and maintenance vehicles equipment is the percentage of those vehicles that have either met or exceeded their ULB.
- **Facilities:** The performance measure for facilities is the percentage of facilities within an asset class, rated below condition 3 on the FTA Transit Economic Requirements Model (TERM) scale.

For Group-TAMP, the Sponsor must set unified performance targets for each asset class in the plan. These targets must

Useful Life Benchmark

ULB is the maximum age of an asset based on operational characteristics (age, mileage, environment) before it is replaced or enters into SGR backlog.

be reported to the NTD by the Sponsor on behalf of the Group-TAMP participants.

Connecticut Group-TAMP Assets

Connecticut's multi-modal transportation system consists of a wide variety of physical assets, as depicted in Figure 3-1.

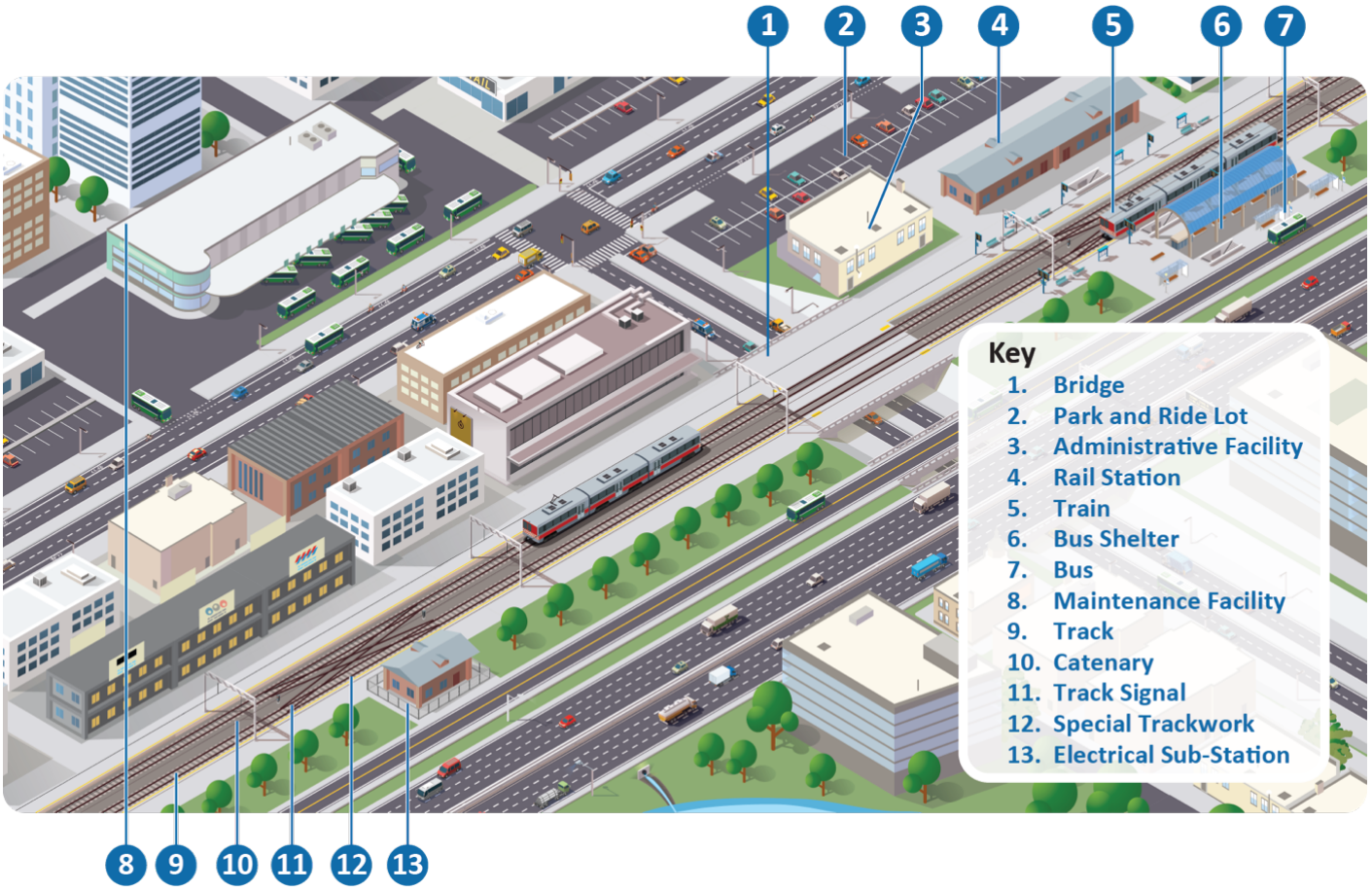


Figure 3-1. Transportation Assets in Connecticut

This Group-TAMP focuses on three transit assets categories: rolling stock, equipment, and facilities. Plan participants own or operate bus service; equipment; and passenger and maintenance facilities for bus. The Group-TAMP asset hierarchy is presented in Figure 3-2.

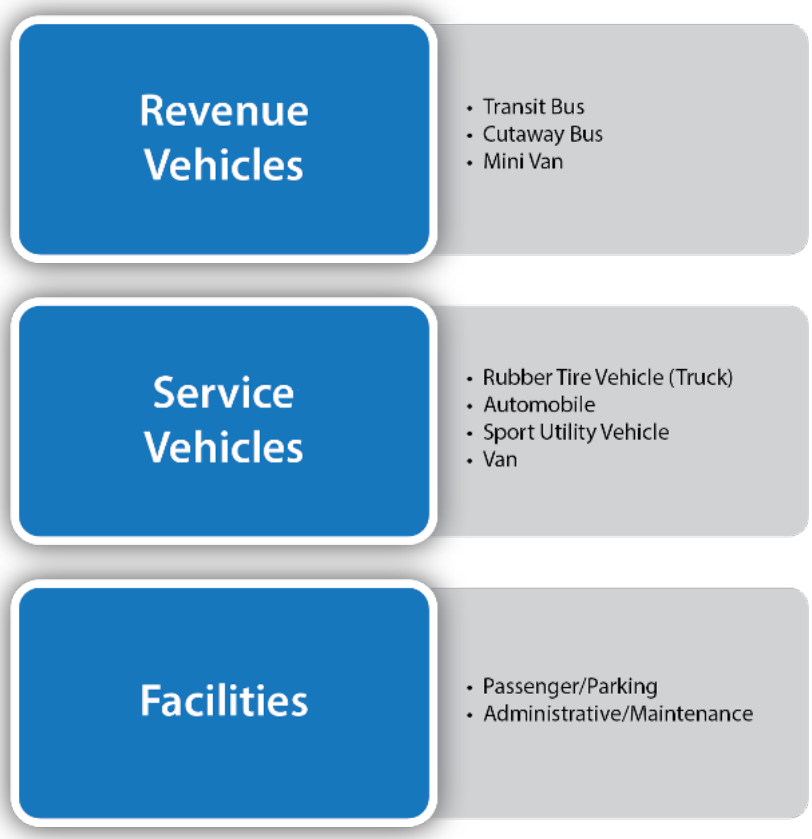


Figure 3-2. Group-TAMP Asset Hierarchy

Connecticut Group-TAMP Transit System Summary

The combined assets of the twelve Transit District TAM plan participants include:

- 449 revenue vehicles
- 58 service vehicles
- 10 administrative / maintenance facilities
- 4 passenger facilities

Additional Tier II providers are included in the inventory. The combined assets of these other Tier II providers include:

- 9 revenue vehicles – Mashantucket Pequot Tribal Nation
- 155 vehicles (funded under FTA Section 5310)
- 1 passenger facility – Town of Mansfield

Tier I and Tier II bus service in Connecticut is shown in Figure 3-3.

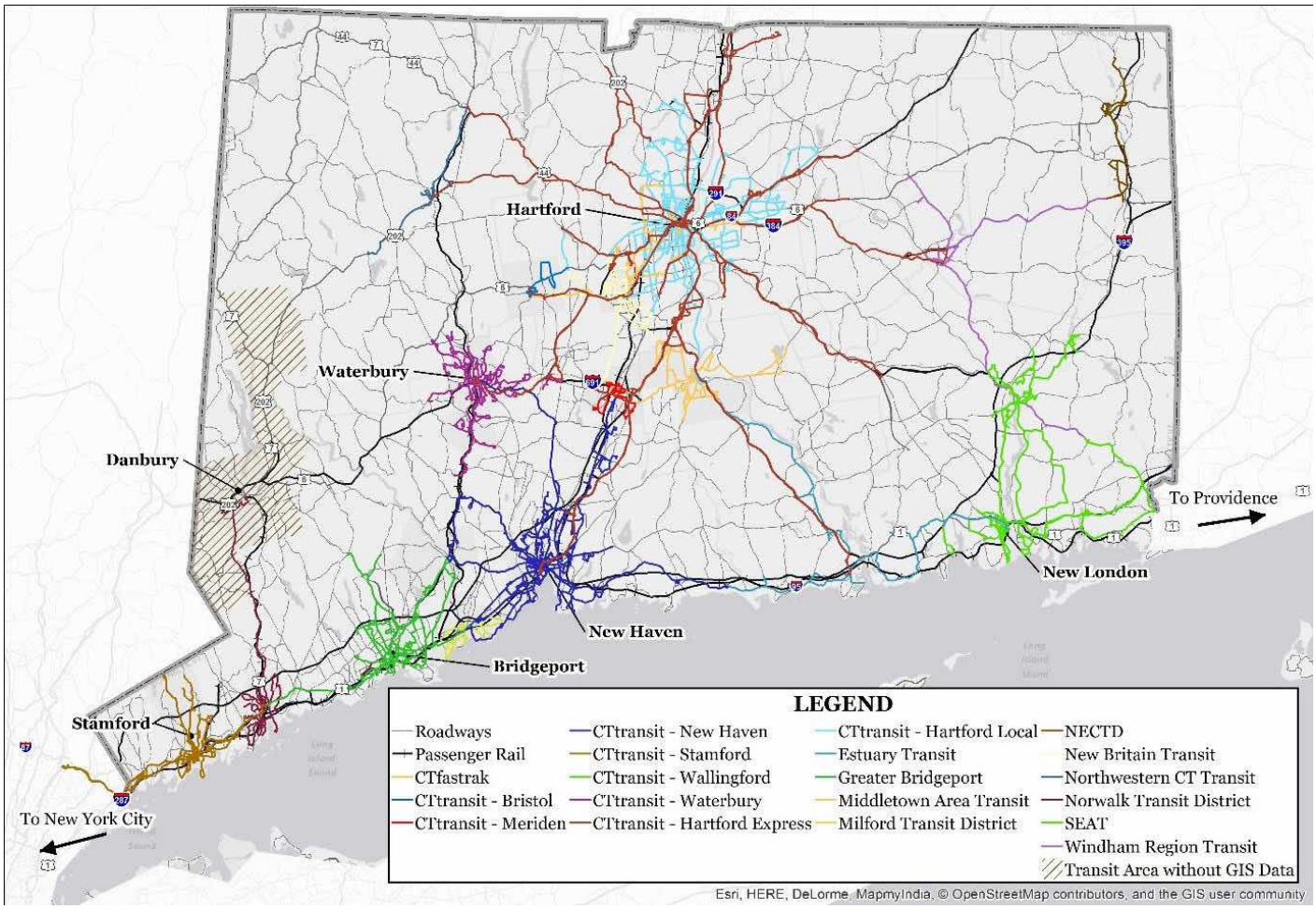


Figure 3--3. Bus Service in Connecticut

Transit districts are shown below in Figure 3-4. Note that Greater Hartford Transit District is a Tier I provider and is not included in this plan. Also, Greater Waterbury does not provide transit services and is not included in this plan. Northeastern CT Transit District also serves the Towns of Hampton and Voluntown.

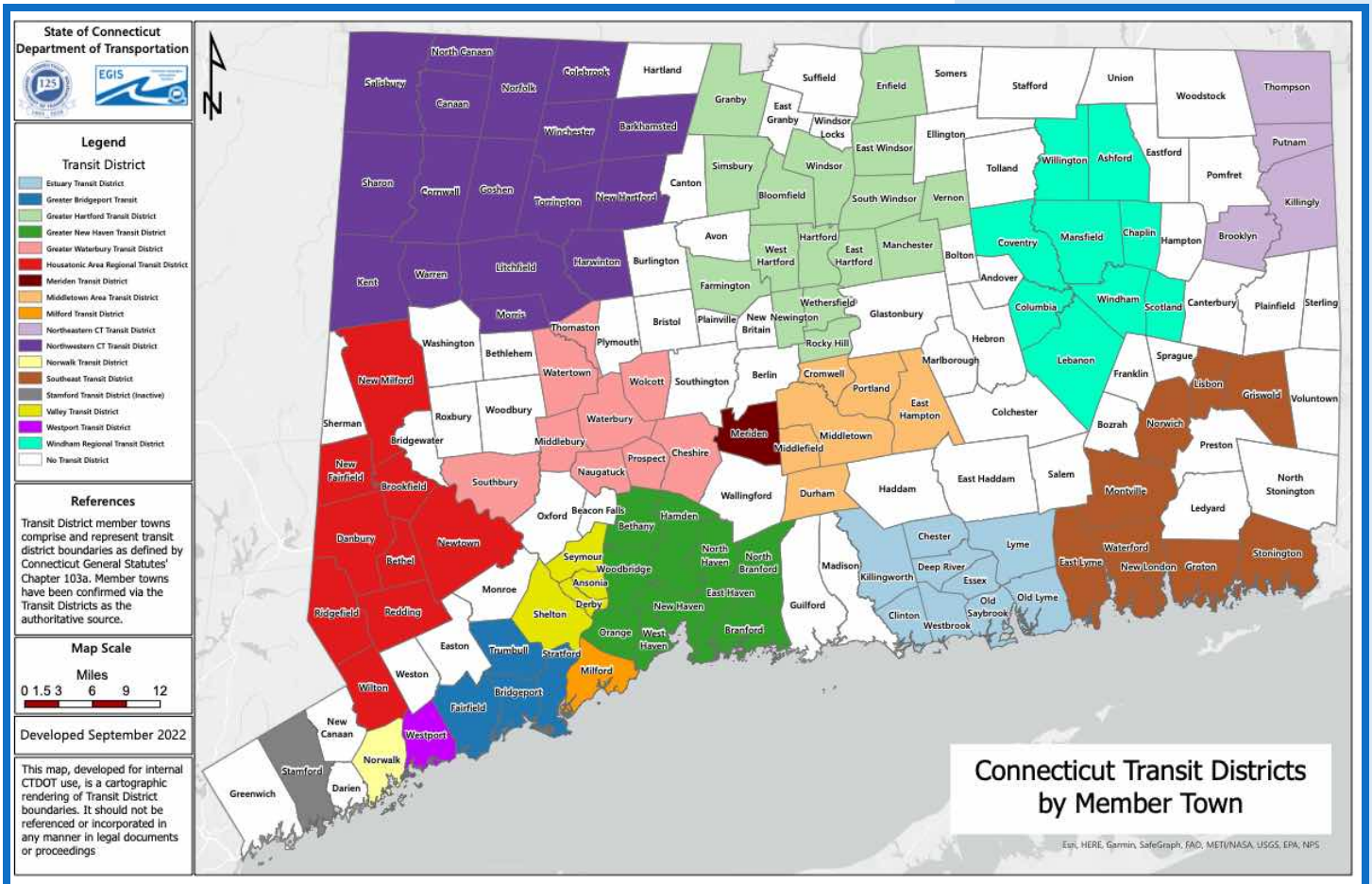


Figure 3-4. Transit Districts in Connecticut

Monitoring and measuring transit asset conditions enables transit providers to assess the performance of the transit system, analyze deficiencies and predict future needs, allocate funding, and prioritize investments to maintain SGR. Asset condition is also an important public-facing measure. Users of the transit network notice and experience asset condition every day and recognize changes in asset condition. Further, public trust and confidence is bolstered when objective measurable results can be demonstrated from increased public investment. For depicting asset conditions, this Group-TAMP uses definitions of asset condition and SGR developed by CTDOT and the Group-TAMP participants and consistent with FTA's mandated performance measures.

Communication

The Group-TAMP is a valuable tool to communicate needs and to advocate for resources.

Asset Data and Inventory Development

Since the development of the 2018 Group-TAMP, CTDOT has been implementing and improving its transit asset inventory, the Transit Asset Management Database, which is described in greater detail in Chapter 4.

Inventory data is collected from the transit service providers and CTDOT Capital Services unit. Transit districts participating in the Group-TAMP are given log-in access to the database and have the ability to directly review, upload, and update their district's asset inventory. CTDOT has an oversight and coordination role, helping approve changes to the database and coordinating the data collection process.

The data resources contributing to the Transit Asset Management Database are depicted in Figure 3-5.

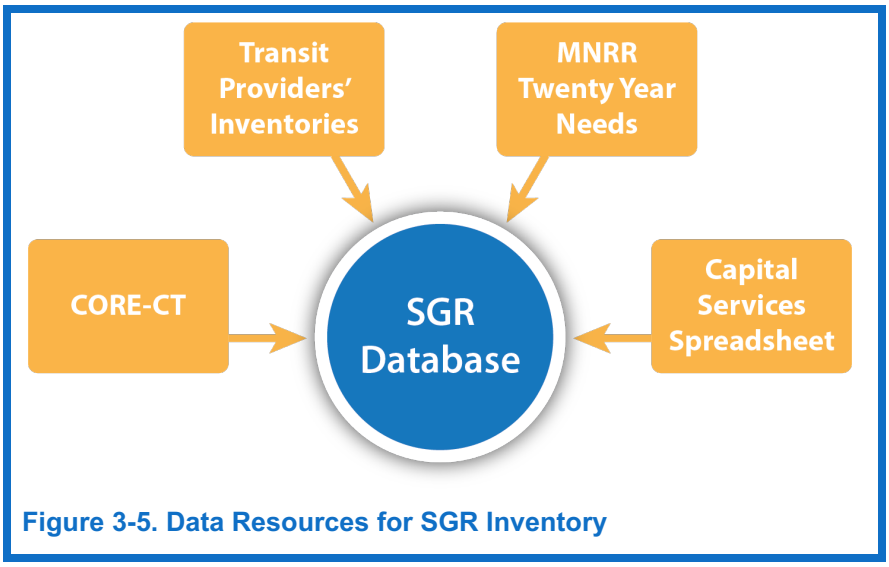


Figure 3-5. Data Resources for SGR Inventory

Rolling Stock and Equipment

Bus

Transit asset inventory was collected from the individual transit service providers and authenticated against CTDOT Capital Services database and the CORE-CT financial register. This step was integral in the process as many of Connecticut transit assets are owned, maintained and operated by the transit service providers thus do not register in the CORE-CT financial record but are subsidized 100% by CTDOT with state and federal funds. Verified bus data was imported into the Transit Asset Management Database.

Facilities

Administrative/Maintenance

Inventory data on Tier II facilities and the level of detail stored on each facility is limited. Thus, for the purpose of developing its Group-TAMP, CTDOT extracted data on administrative/maintenance facilities from various sources.

Existing condition data available for administrative/maintenance facilities varied by specific type of facility. Since the last TAMP, CTDOT began a series of facility inspections which include component-level condition data.

Facility Assessment Program

Starting in 2019, CTDOT began funding a series of inspections for Tier II operator facilities in order to collect component-level condition data in a standardized format. The inspections, which are performed by consultants hired by CTDOT, are scheduled to inspect all transit facilities on a rolling four year basis. 25% of the facilities are inspected each year and the detailed data is used to establish condition ratings for the facilities.

The districts with facility inspections completed include HARTransit, MAT, MTD, SEAT, and WRTD. Other transit

districts, such as GBTA and Norwalk Transit, recently performed detailed, component-level condition assessments. For these facilities, the TAM Group extracted component-level data to calculate the overall condition of the facility, according to the condition assessment approach presented in this chapter.

For other facilities, an overall condition rating was assigned. For these facilities, component-level conditions were manually determined for each facility using the overall facility condition and facility age.

Passenger

Inventory data on Connecticut Tier II passenger facilities are stored in the transit providers' asset registries. The level of detail stored on each facility varies. Thus, for the purpose of developing its Group-TAMP, CTDOT extracted data on passenger facilities from the transit providers' asset registries and imported the data to the Transit Asset Management Database.

Rolling Stock

In 49 CFR §625.5, FTA defines rolling stock as a revenue vehicle used in providing public transportation, including vehicles used for carrying passengers on fare-free services. This Group-TAMP includes bus rolling stock.

Rolling Stock

Revenue vehicle used in providing public transportation

Bus Rolling Stock

Bus transit is an integral piece of Connecticut's public transportation system. Buses provide affordable, equitable, and reliable mobility to Connecticut travelers. FTA defines the bus transit mode as comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways. Vehicles can be powered by diesel, gasoline, battery, or alternative fuel engines contained within the vehicle.

Transit districts provide bus service in areas not already served by CTDOT and CT*transit*. The districts provide both fixed route, deviated fixed route and demand response service, and are managed by Boards of Directors representing the towns in the districts. Districts operate a variety of vehicle types, which are defined in the 2017 NTD Glossary[1].

1 FTA. *National Transit Database Glossary*. FTA, 2017.

Bus Types

Transit Bus: A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways. Vehicles are powered by:

- Diesel
- Gasoline
- Battery
- Alternative fuel engines contained within the vehicle.

Cutaway: A vehicle that consists of a bus body that is mounted on the chassis of a van or light-duty truck. The original van or light-duty truck chassis may be reinforced or extended. Cutaways typically seat 8 or more passengers and may accommodate some standing passengers.

Minivan: A light duty vehicle having a typical seating capacity of up to four passengers plus a driver; and may accommodate a wheelchair. A minivan is smaller, lower and more streamlined than a full-sized van, but it is typically taller and has a higher floor than a passenger car. Minivans normally cannot accommodate standing passengers.

Bus Condition Assessment and Performance Measures

The purpose of the rolling stock condition assessment is to provide an overall snapshot of the current state of repair of a fleet to aid in decisions concerning when it is most cost effective to replace it.

FTA's mandated performance measure for rolling stock is the percentage of assets within a class that have met or exceed their ULB. An asset is deemed to be in SGR if its age

is less than the ULB specified for the corresponding asset type. Likewise, an asset is deemed to no longer be in SGR if its age equals or exceeds the corresponding ULB. The ULB value may be specified in terms of asset age, mileage and/or other factors. FTA provides a set of default ULB values by asset type, all of which are specified in terms of asset age. An agency can use these or set its own values.

CTDOT has worked with transit service providers in Connecticut to define custom ULB values. The custom ULBs align more with the Connecticut operating environment. The miles incurred by Connecticut's vehicles annually can far exceed the useful life of that vehicle class, particularly for cutaway bus, vans and mini vans utilized for paratransit service.

The climate of the Northeast further adds to the deterioration of vehicles caused by salt and chemical treatments of the roads in Connecticut. The ULB values for bus rolling stock are listed in Table 3-1.

Table 3-1. ULB Values for Bus Rolling Stock

Asset Type	FTA Default ULB (years)	Connecticut ULB (years)
Transit Bus	14	12
Cutaway	10	5
Minivan	8	5

Bus Inventory and Conditions

Inventory registries of Connecticut transit providers are individually maintained by the providers. CTDOT Capital Services Unit maintains an inventory of all Connecticut transit providers' buses. For the purpose of developing the Group-TAMP, the TAM group compared and validated revenue vehicle data from CORE-CT where applicable, CT Capital Services and transit providers' registries, aggregated it by fleet, and imported the data into the Transit Asset Management Database. The data was then reviewed and updated by the transit providers and validated by CTDOT.

In total, the Group-TAMP participants own 458 revenue vehicles, which includes 9 revenue vehicles owned by the Mashantucket Pequot Tribal Nation. There are an additional 155 vehicles funded through FTA Section 5310. Condition data for vehicles funded through FTA Section 5310 are not included in the TAPT prioritization model discussed in chapter four.

Table 3-2 summarizes bus inventory and condition for all transit districts in the Group-TAMP.

Table 3-2. Tier II Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	172 vehicles	95%	5%	
Cutaway Bus	279 vehicles	43%	57%	
Minivan	7 vehicles	0%	100%	

Tables 3-3 through Table 3-16 summarize bus inventory and condition, organized by transit provider.

Table 3-3. ETD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	4 vehicles	100%	0%	
Cutaway Bus	14 vehicles	93%	7%	

Table 3-4. GBTA Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	53 vehicles	98%	2%	
Cutaway Bus	26 vehicles	0%	100%	

Table 3-5. GNHTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Cutaway Bus	80 vehicles	45%	55%	
Minivan	6 vehicles	0%	100%	

Table 3-6. HARTransit Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	28 vehicles	100%	0%	
Cutaway Bus	33 vehicles	49%	51%	

Table 3-7. MAT Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	10 vehicles	100%	0%	
Cutaway Bus	9 vehicles	11%	89%	

Table 3-8. MTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	9 vehicles	78%	22%	
Cutaway Bus	11 vehicles	0%	100%	

Table 3-9. NECTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Cutaway Bus	10 vehicles	80%	20%	

Table 3-10. NWCTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Cutaway Bus	12 vehicles	50%	50%	
Minivan	1 vehicles	0%	100%	

Table 3-11. NWLKTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	36 vehicles	89%	11%	
Cutaway Bus	35 vehicles	26%	74%	

Table 3-12. SEAT Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	24 vehicles	100%	0%	
Cutaway Bus	12 vehicles	58%	42%	

Table 3-13. VTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Cutaway Bus	14 vehicles	100%	0%	

Table 3-14. WRTD Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Transit Bus	8 vehicles	75%	25%	
Cutaway Bus	14 vehicles	50%	50%	

Table 3-15. Mashantucket Pequot Tribal Nation

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Cutaway Bus	9 vehicles	44%	56%	

Table 3-16. FTA Section 5310 Bus Inventory

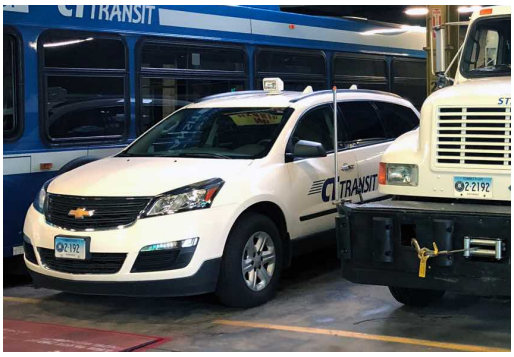
Asset Type	Inventory
Cutaway Bus	155 vehicles

Equipment

In 49 CFR §625.5, FTA defines equipment as an article of nonexpendable, tangible property having a useful life of at least one year. In Connecticut's case, most equipment assets are service vehicles, defined by FTA as equipment used primarily to support maintenance and repair work for public transportation. Examples of service vehicles provided in the 2017 NTD Glossary include tow trucks, supervisor vans, transit, staff cars, and maintenance vehicles for maintaining passenger facilities and rights-of-way.

Note that the transit providers inventory includes a small number of additional pieces of equipment valued at $50,000 or more, but these are not detailed here.

Service Vehicle Types



Automobiles: Passenger cars, up to and including station wagons in size. Excludes minivans and anything larger.

Rubber Tire Vehicles (Truck): Any motor vehicle designed to transport Cargo

Service Vehicle Types

Sport Utility Vehicle: A high-performance four-wheel drive car built on a truck chassis. It is a passenger vehicle which combines the towing capacity of a pickup truck with the passenger-carrying space of a minivan or station wagon.

Van: An enclosed vehicle having a typical seating capacity of 8 to 18 passengers and a driver. A van is typically taller and with a higher floor than a passenger car, such as a hatchback or station wagon.

Equipment Condition Assessment and Performance Measures

Connecticut's transit districts use the same basic approach for assessing condition of equipment as for rolling stock. Specifically, a ULB value is established for equipment type. A piece of equipment is assessed as being in SGR if its age is less than the corresponding ULB, and not in SGR if it meets or exceeds the ULB. This approach supports reporting of FTA's mandated SGR performance measure for equipment: the percentage of service vehicles that have met or exceed their ULB. Connecticut's ULBs for equipment are listed in Table 3-17.

Table 3-17. Custom ULB Values for Equipment

Asset Type	FTA Default ULB (years)	Connecticut ULB (years)
Truck	**14**	**14**
Automobile	**8**	**5**
Sport utility vehicle	**8**	**5**
Van	**8**	**5**

Equipment Inventory and Condition

In total, the Group-TAMP participants own 58 service vehicles. Table 3-18 summarizes service vehicle inventory and condition for all transit districts in the Group-TAMP. Equipment other than service vehicles valued below $50,000 is not required to be included in this inventory. Many of the Tier II transit providers have equipment valued below $50,000 which is not reflected in this inventory.

Table 3-18. Tier II Bus Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	23 vehicles	78%	22%	
Automobile	2 vehicles	0%	100%	
SUV	26 vehicles	19%	81%	
Van	7 vehicles	29%	71%	

Tables 3-19 thru 3-28 summarize equipment inventory and condition, organized by service provider.

Table 3-19. ETD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	1 vehicles	0%	100%	
SUV	3 vehicles	33%	67%	

Table 3-20. GBTA Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	7 vehicles	71%	29%	
Automobile	2 vehicles	0%	100%	
SUV	4 vehicles	0%	100%	

Table 3--21. GNHTD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	2 vehicles	100%	0%	
SUV	4 vehicles	0%	100%	

Table 3-22. HARTransit Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	4 vehicles	75%	25%	
SUV	3 vehicles	0%	100%	
Van	2 vehicles	0%	100%	

Table 3-23. MAT Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	1 vehicles	100%	0%	
SUV	1 vehicles	100%	0%	
Van	1 vehicles	0%	100%	

Table 3--24. MTD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	2 vehicles	50%	50%	
SUV	1 vehicles	0%	100%	

Table 3-25. NWLKTD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	2 vehicles	100%	0%	
SUV	4 vehicles	50%	50%	

Table 3-26. SEAT Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	3 vehicles	100%	0%	
SUV	3 vehicles	0%	100%	
Van	4 vehicles	50%	50%	

Table 3-27. VTD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
Truck	1 vehicles	100%	0%	
SUV	2 vehicles	50%	50%	

Table 3-28. WRTD Equipment Inventory and Condition

Asset Type	Inventory	Vehicles below ULB	Vehicles met or exceeded ULB	
SUV	1 vehicles	0%	100%	

Inventory data including model year (used to determine age) are stored by vehicle in the Transit Asset Management Database.

Facilities

Connecticut transit districts own and operate two basic types of transit facilities: administrative/ maintenance facilities, and passenger facilities. The condition assessment approach is similar for both facility types, and relies on visual inspection of primary facility components. However, the specific facility components and available data differ between the two types of facilities.

Facilities Types

Administrative/Maintenance: Administrative facilities are typically offices that house management and supporting activities for overall transit operations such as accounting, finance, engineering, legal, safety, security, customer services, scheduling, and planning. They also include facilities for customer information or ticket sales, but that are not part of any passenger station. Maintenance facilities are those where routine maintenance and repairs or heavy maintenance or unit rebuilds are conducted.

Passenger/Parking: Passenger facilities are significant structures on a separate ROW. Examples include

- All motorbus, rapid bus, commuter bus, and trolley bus passenger facilities in a separate ROW that have an enclosed structure (building) for passengers for items such as ticketing, information, restrooms, and concessions
- All transportation, transit or transfer centers, and transit malls if they have an enclosed structure (building) for passengers for items such as ticketing, information, restrooms, concessions, and telephones

Administrative / Maintenance Facilities

Administrative/Maintenance Facility Condition Assessment and Performance Measures

Connecticut transit districts assess facility condition using an approach based on FTA's guidance detailed in *TAM Facility Performance Measure Reporting Guidebook:*

Condition Assessment Calculation. FTA's guidance is intended to support calculation of FTA's mandated SGR performance measure for facilities, which is the percentage of facilities within an asset class rated less than 3 on the five-point scale used in TERM. CTDOT's approach, which was developed with input from the transit districts, is detailed in a Condition Assessment Guidance document, included in Appendix D.

Major facility components are inspected and rated on a 1 to 5 condition scale. The condition rating values and their descriptions are listed in Table 3-29. The components are listed in Table 3-30.

Table 3-29. FTA TERM Condition Assessment Scale

Rating	Condition	Description
5	**Excellent**	No visible defects, new or near new condition, may still be under warranty if applicable
4	**Good**	Good condition, but no longer new, may be slightly defective or deteriorated, but is overall functional
3	**Adequate**	Moderately deteriorated or defective; but has not exceeded useful life
2	**Marginal**	Defective or deteriorated in need of replacement; exceeded useful life
1	**Poor**	Critically damaged or in need of immediate repair; well past useful life

The specific components of administrative/maintenance facilities are listed below. Note that the first nine components listed in the table are assessed for each building in the facility, and the final component, Site, is assessed for the site as a whole.

Table 3-30. Administrative/Maintenance Facility Components

Inventory Unit	Component	Notes	Typical Useful Life* (years)	Component Condition Weight**
Building	**Substructure**		**30**	**1.0**
Building	**Shell**		**30**	**1.0**
Building	**Interior**		**30**	**1.0**

Building	**Plumbing**	May need to assess based on age	**20**	**1.0**
Building	**HVAC**	May need to assess based on age	**20**	**1.0**
Building	**Electrical**	May need to assess based on age	**30**	**1.0**
Building	**Fire Protection**	See Table 5	**20**	**1.0**
Building	**Conveyance**	See Table 5	**20**	**1.0**
Building	**Equipment**	Includes fixed specialty equipment	**30**	**1.0**
Building	**Site**		**50**	**1.0**

*Useful life can be utilized for components that cannot be visually inspected.
**Component Condition Weight represents the relative importance of the component compared to other components. By default, these numbers are 1.0. However, based on the agency's experiences and practices, the inspector can use a different number to lower or raise the importance of a component and thus change how component conditions impact the overall facility condition.

For some components, a visual inspection may be insufficient for establishing conditions. In these cases, an age-based approach is used to estimate condition using useful life for the component listed in Table 3-30 with the conversion scale shown in Table 3-31. Useful life is the average amount of time in years that an item, component, or system is economically efficient to keep in operation.

Table 3-31. Conversion Scale: Asset Age to FTA TERM Condition Rating

Asset Age as % of ULB	TERM Rating	Condition
New	**5**	**Excellent**
< 50%	**4**	**Good**
>50% and <100%	**3**	**Adequate**
>100% and <125%	**2**	**Marginal**
>125%	**1**	**Poor**

*Useful life can be utilized for components that cannot be visually inspected.

For Fire Protection and Conveyance, separate inspections are typically performed to assess code compliance. Transit

districts use the results from those inspections in performing their condition assessment, applying the condition assessment scale shown in Table 3-32 for these components.

Table 3-32. Fire Protection and Conveyance Condition Assessment Scale

Rating	Condition	Description
5	**Excellent**	System is new and there are no identified code issues
4	**Good**	System is not new, but there are no identified code issues
3	**Adequate**	Isolated code issues exist that can be addressed through maintenance
2	**Marginal**	Code issues exist that do not necessitate facility closure
1	**Poor**	Extensive code issues have been identified that may necessitate facility closure

Given the individual component conditions, the overall condition of the facility can be calculated as:

$$Condition = \frac{\sum_{i=1}^{n} c_i f_i r_i}{\sum_{i=1}^{n} f_i r_i}$$

where c_i is the condition of component i, f_i is the weight factor listed in Table 3-19, and r_i is the replacement cost of the component.

However, rolling up the components to a facility-level average rating can present a less complete picture of conditions. For example, if half the components are rated 2 and half are rated 5, the facility would be considered in a state of good repair despite half its components not being a state of good repair. This TAMP instead uses the percent of components rated 3 or above on the TERM scale as the performance measure for facility condition.

Administrative/Maintenance Facility Inventory and Condition

Inventory data on Connecticut facilities are stored in the Transit Asset Management Database. The Transit Districts own their administrative/maintenance facilities, with the exception of WRTD and SEAT in which CTDOT has 100%

capital responsibility. Thus, for the purpose of developing its Group-TAMP, CTDOT extracted data on administrative/maintenance facilities from the transit providers' asset registries, then manually reviewed data for each facility.

In total, the transit districts own ten administrative/maintenance facilities, nine of which have current condition data based on a formal condition assessment as shown in Table 3-33. For Connecticut transit districts for which formal condition assessments have not been performed, condition ratings are based on visual engineering inspections.

Table 3-33. Administrative/Maintenance Facility Formal Condition Assessments by Transit District

Transit District	Administrative/ Maintenance Facilities Formal condition assessment
GBTA	Yes
NWLK	Yes
VTD	Yes
GNHTD	No
HARTransit	Yes
MAT	Yes
MTD	Yes
SEAT	Yes
WRTD	Yes

Table 3-34 summarizes administrative/maintenance facility inventory and condition for all transit providers in the Group-TAMP.

Table 3-34. Tier II Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	10 facilities	94%	6%	

Tables 3-35 through 3-43 summarize the administrative/maintenance facility inventory and condition for Connecticut transit districts.

Table 3-35. GBTA Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	100%	0%	

Table 3-36. GNHTD Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	100%	0%	

Table 3-37. HARTransit Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	90%	10%	

Table 3-38. MAT Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	2 facilities	100%	0%	

Table 3-39. MTD Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	78%	22%	

Table 3-40. NWLK TD Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	67%	33%	

Table 3-41. SEAT Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	89%	11%	

Table 3-42. VTD Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	100%	0%	

Table 3-43. WRTD Administrative/Maintenance Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Administrative /Maintenance Facility	1 facilities	100%	0%	

Passenger Facilities

In total, Connecticut transit districts own 4 passenger facilities and the Tier II provider of the Town of Mansfield owns 1 passenger facility.

Passenger Facility Condition Assessment and Performance Measures

The condition assessment approach for passenger facilities is similar to that for administrative/maintenance facilities. The approach described here is based on FTA's guidance detailed in TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation. FTA's guidance is intended to support calculation of FTA's mandated SGR performance measure for facilities, which is the percentage of facilities within an asset class rated less than 3 on the five-point TERM scale.

Major facility components are inspected and rated on a 1 to 5 condition scale. The condition rating values and their

descriptions are listed in Table 3-29. The components are listed in Table 3-44.

Regarding the specific components of passenger facilities, note that first nine listed in the table below are assessed for each building in the facility. Three components are assessed for each platform, and Site is assessed for the site as a whole.

Table 3-44. Passengers Facility Components

Inventory Unit	Component	Notes	Typical Useful Life* (years)	Component Condition Weight**
Building	Substructure		30	1.0
Building	Shell		30	1.0
Building	Interior		30	1.0
Building	Plumbing	May need to assess based on age	20	1.0
Building	HVAC	May need to assess based on age	20	1.0
Building	Electrical	May need to assess based on age	30	1.0
Building	Fire Protection	See Table 5	20	1.0
Building	Conveyance	See Table 5	20	1.0
Building	Fare Collection		20	1.0
Platform	Structure		30	1.0
Platform	Canopy		30	
Platform	Electrical		30	
Site	Site		50	

*Useful life can be utilized for components that cannot be visually inspected.
**Component Condition Weight represents the relative importance of the component compared to other components. By default, these numbers are 1.0. However, based on the agency's experiences and practices, the inspector can use a different number to lower or raise the importance of a component and thus change how component conditions impact the overall facility condition.

The other details of the assessment process are identical to that described previously for administrative/maintenance

facilities. Table 3-31 lists rating values to use if the agency uses age as a proxy for condition. Table 3-32 lists specific condition assessment language to use for fire protection and conveyance. Given the individual component conditions, the overall condition of the facility is calculated as:

$$Condition = \frac{\sum_{i=1}^{n} c_i f_i r_i}{\sum_{i=1}^{n} f_i r_i}$$

where c_i is the condition of component i, f_i is the weight factor listed in Table 3-43, and r_i is the replacement cost of the component.

This TAMP uses the percent of components rated 3 or above on the TERM scale as the performance measure for facility condition.

Passenger Facility Inventory and Condition

Inventory data on CTDOT facilities are stored in the Transit Asset Management Database. For Tier II facilities with recent detailed inspections, component-level conditions are used to calculate conditions. For facilities without recent, detailed inspection, component-level conditions were manually determined for each facility using the overall facility condition, facility age, and visual engineering inspections.

In total, the transit providers own five passenger facilities. Table 3-45 summarizes passenger facility inventory and condition for all transit providers in the Group-TAMP.

Table 3-45. Tier II Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	**5** facilities	94%	6%	

Tables 3-46 thru 3-50 summarize passenger facility inventory and condition.

Table 3-46. GBTA Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	1 facilities	100%	0%	

Table 3-47. HARTransit Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	1 facilities	100%	0%	

Table 3-48. MAT Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	1 facilities	67%	33%	

Table 3-49. NWLKTD Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	1 facilities	100%	0%	

Table 3-50. Town of Mansfield Passenger Facility Inventory and Condition

Asset Type	Inventory	Components Rated 3 or above on TERM scale	Components Rated below 3 on TERM scale	
Passenger Facility	1 facilities	100%	0%	

FTA Performance Measures

As mentioned throughout this chapter, FTA has established SGR performance measures for the three capital asset categories required for a Group-TAMP. Transit providers must set one-year performance targets for each applicable performance measure. These targets must be updated and submitted to the NTD annually. For a Group-TAMP, the Sponsor must set unified performance targets for each asset class in the plan. These targets must be reported to the NTD by the Sponsor on behalf of the Group-TAMP participants.

For rolling stock and equipment, CTDOT uses FTA performance measures to track asset condition. Targets in Connecticut are set using the following business practice process adopted by CTDOT:

> *Target (%) = # of years to procure asset / ULB + 2 years to procure*

For example, a bus asset with a procurement time of two years and a ULB of 12 years would have a 14% target.

For facilities, CTDOT uses the FTA performance measure required for NTD reporting. CTDOT's condition assessment approach was developed to meet the FTA requirements and deliver condition data for calculating the performance measure. FTA requires facilities to be inspected at least every 4 years, but initially only requires 25% of all facilities to be inspected and reported each year.

Performance Comparison (2017 vs. 2021)

A summary of the FTA performance measures and Group-TAMP targets is provided in Tables 3-51 thru 3-53.

Revenue and Service Vehicles

Between 2017 and 2021, 66 Tier II transit buses were purchased, resulting in a significant improvement in transit bus condition that now meets CTDOT's performance target. In addition, 77 cutaways and 12 service vehicles were

purchased. With these new assets, performance metrics for other vehicle sub classes remained fairly consistent.

Facilities

An aspirational target of 0% was initially set across the board for all transit facilities for the 2018 Group TAMP. The Department is implementing a Statewide Public Transportation facilities inspection program for maintenance, administrative, and passenger facilities under the agencies' capital responsibility, which started in the summer of 2019. This program includes inspection of transit district facilities to determine condition at component and an overall condition for current state of repair.

The Town of Mansfield conducts their own annual condition assessments for their respective facility. All of the facilities inspected between 2019 and 2021 were in SGR.

Table 3-51. FTA Performance Measures and Targets for Rolling Stock

Performance Measure	Asset Class	Previous Performance (SFY17)	Current Performance (SFY21)	Performance Target (SFY22)
Percentage of vehicles that have met or exceed their ULB	Transit Bus	24%	5%	14%
	Cutaway Bus	46%	57%	17%
	Minivan	0%	100%	17%

Table 3-52. FTA Performance Measures and Targets for Equipment

Performance Measure	Asset Class	Previous Performance (SFY17)	Current Performance (SFY21)	Performance Target (SFY22)
Percentage of equipment that have met or exceed their ULB	Rubber Tire Vehicle (truck)	32%	22%	7%
	Automobile	100%	100%	17%
	SUV	29%	81%	17%
	Van	40%	71%	17%

Table 3-53. FTA Performance Measures and Targets for Facilities

Performance Measure	Asset Class	Previous Performance (SFY17)	Current Performance (SFY21)	Performance Target (SFY22)
Percentage of facilities within an asset class, rated below condition 3 on the TERM scale	Administrative/ Maintenance	0%	0%	0%
	Passenger	0%	0%	0%

Chapter 4

Analytical Approach

Asset management involves operating, maintaining, and improving assets using analysis to identify a sequence of actions that will achieve a state of good repair over the life cycle of the assets. Thus, asset management concepts apply over the full life of an asset, spanning from installation or construction of an asset to its replacement or retirement. As part of asset management practice, CTDOT makes investment decisions that consider not only the current condition, but also the full life cycle and associated costs of assets. Analytical processes and decision support tools help support CTDOT's investment decisions and develop a prioritized list of needs.

Overview

As the sponsor for Connecticut's Group-TAMP, CTDOT coordinated with participants in gathering asset data, developing an analytical process, and modeling transit investment needs for Tier II providers. This chapter describes CTDOT's analytical approach for its transit assets, which is also the approach for the transit assets of Tier II providers in this Group-TAMP.

CTDOT's approach for analyzing transit investment needs relies on two systems. First, the asset data described in Chapter 3 are stored in single, integrated database, the Transit Asset Management Database. Also, to perform the analysis and prioritization of SGR needs, CTDOT is using a customized version of the Transit Asset Prioritization Tool (TAPT) developed through the Transit Cooperative Research Program (TCRP) and included with TCRP Report 172. Deterioration models and costs used with the tool are based on Connecticut data (where available), or alternatively on the TAPT defaults from the FTA Transit Economic Requirements Model (TERM).

Federal Requirements

In 49 CFR 625.25, FTA requires that a group TAM plan include a "description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization."

Transit Asset Management Database

The Transit Asset Management Database is a relational database that integrates the asset condition inventory and condition data used to develop this plan. The database is a SQL Server database with a web-based user interface. Figure 4-1 shows an example screenshot of the system.

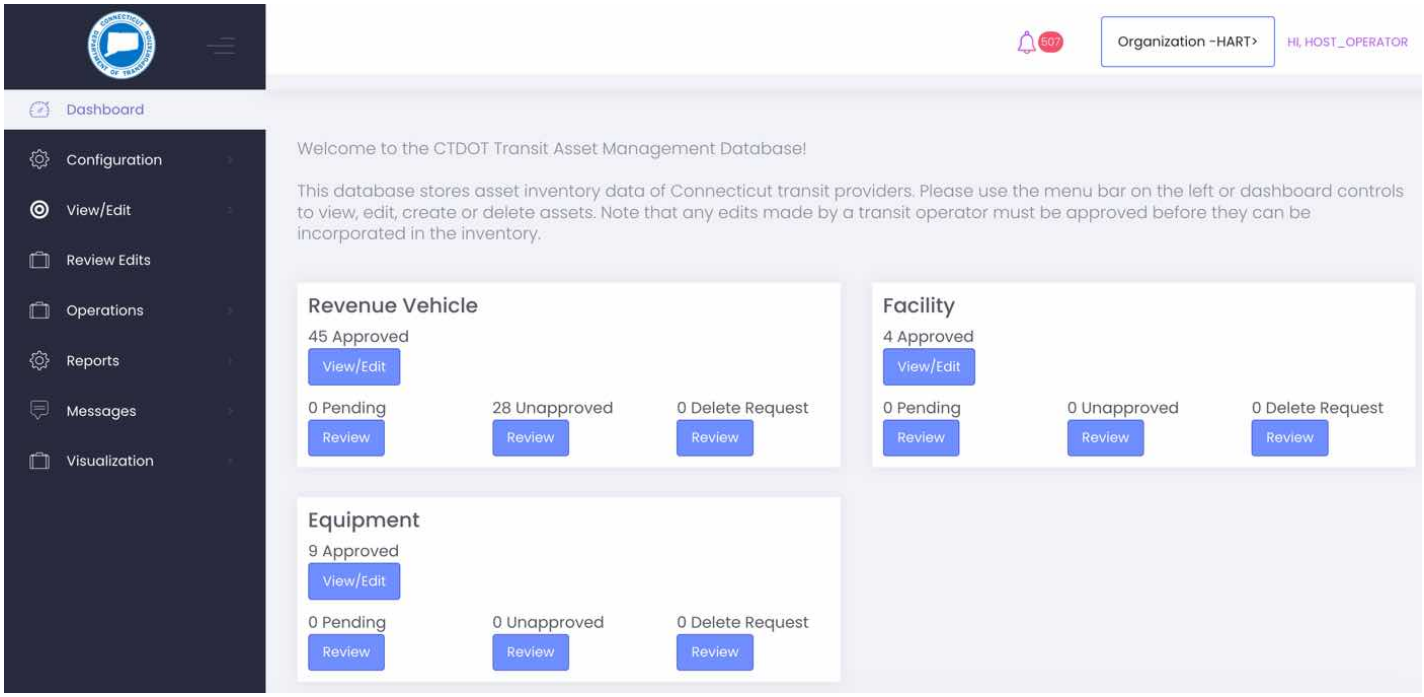


Figure 4-1. CTDOT Transit Asset Management Database

The database is structured to store data on any asset, with the ability to add asset types and attributes without changing the underlying database structure. Also, the database supports specification of parent-child relationships, so that complex asset hierarchies can be specified if needed. For instance, for facilities a record is stored for each individual facility, as well as for each building on the facility site.

Asset types currently stored in the database correspond to those identified in Chapter 3. Note that in the case of revenue vehicles the database stores data by individual vehicles, though analysis and reporting to the National Transit Database (NTD) is typically performed by subfleet.

The attributes stored for each asset necessarily vary by asset type, and include those required to identify the asset and support use of TAPT for modeling investment needs as described in the following section. For instance, for buildings the database stores data on the construction date of the facility, the construction cost, floor area, and the condition of the building components listed in Chapter 3. However, CTDOT and individual transit operators have significant additional information on buildings used for day-to-day management stored in other systems.

Data are exported for use in TAPT using a set of custom views defined by asset type. Also, project team members exported the views to spreadsheet form to facilitate review and verification of the data.

Analytical Tool

CTDOT uses TAPT to support its analytical approach. TAPT is a spreadsheet tool for predicting transit asset conditions and SGR needs. Figure 4-2 is a diagram illustrating the structure of TAPT.

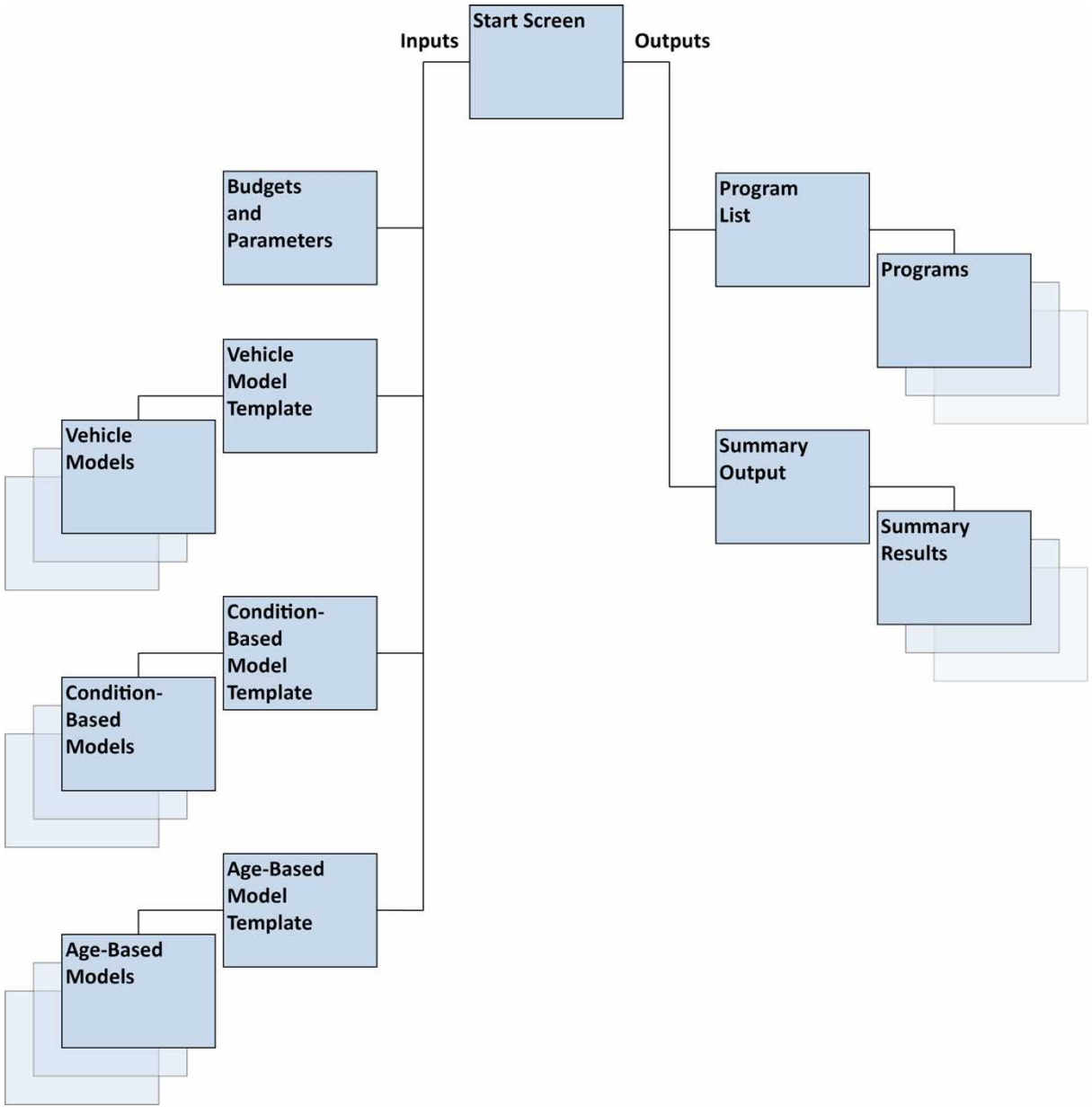


Figure 4-2. TAPT User Interface Organization

As shown in the figure, the tool has a single start screen that supports navigation, generation of new models, and performing an analysis. The tool has templates for vehicle models, age-based-models, and condition-based models. TAPT also includes a single worksheet for entry of major parameters and budgets, as well as worksheets for viewing summary and detailed outputs of an analysis. The tool creates new worksheets with summary outputs and detailed outputs (the program list) for each analysis a user performs.

Figure 4-3 illustrates the start screen of the tool, which provides the tool user the ability to create a new asset model, edit an existing model, run the prioritization model (which uses the asset models), and/or view results.

TAPT

The tool has a series of models for different asset types that recommend when to rehabilitate or replace an asset, and the conditions and performance predicted for the asset over time. Also, the tool supports prediction of the overall performance resulting for a specified funding scenario, and recommends a prioritized list of projects to fund given a budget constraint.

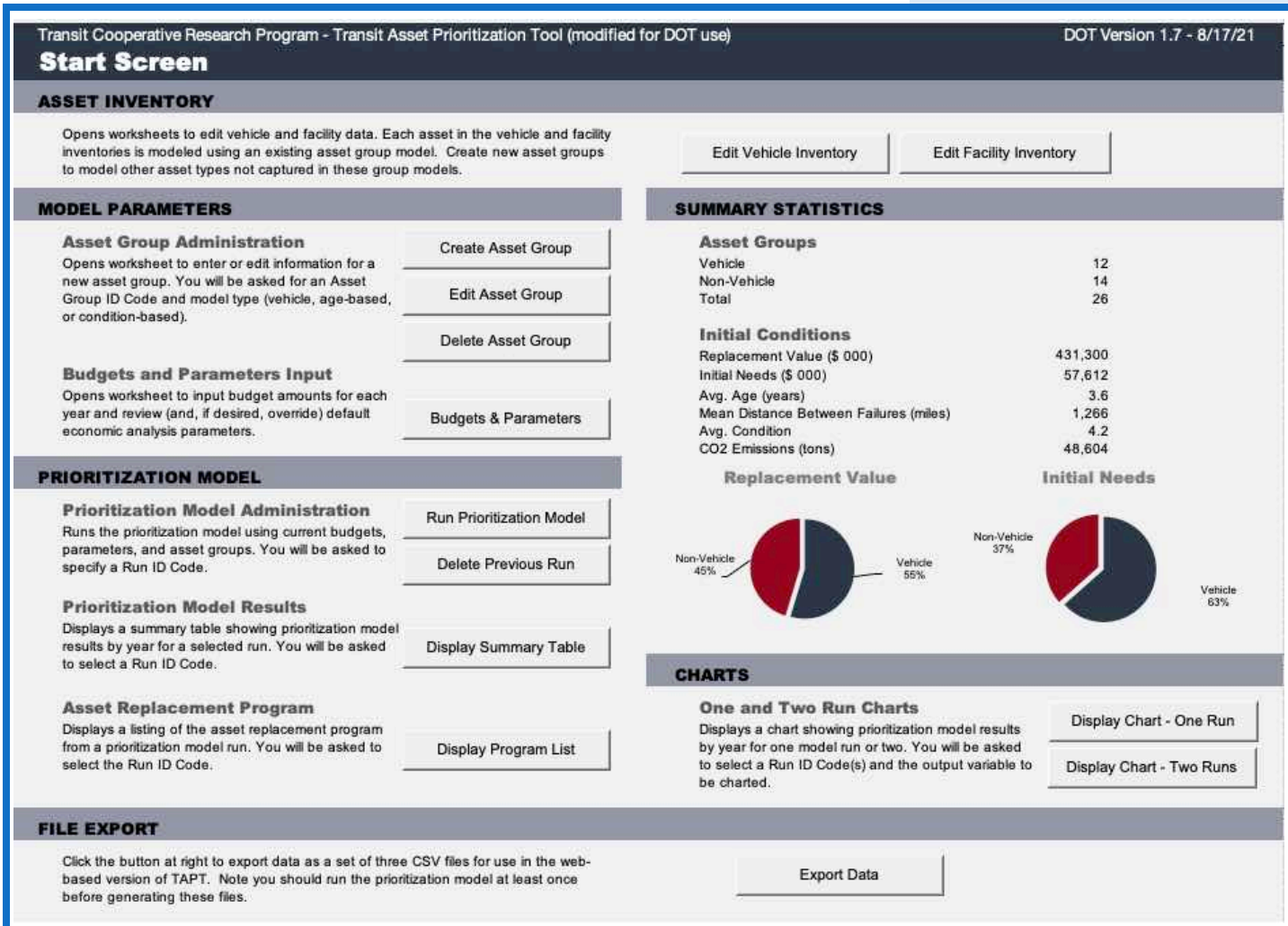


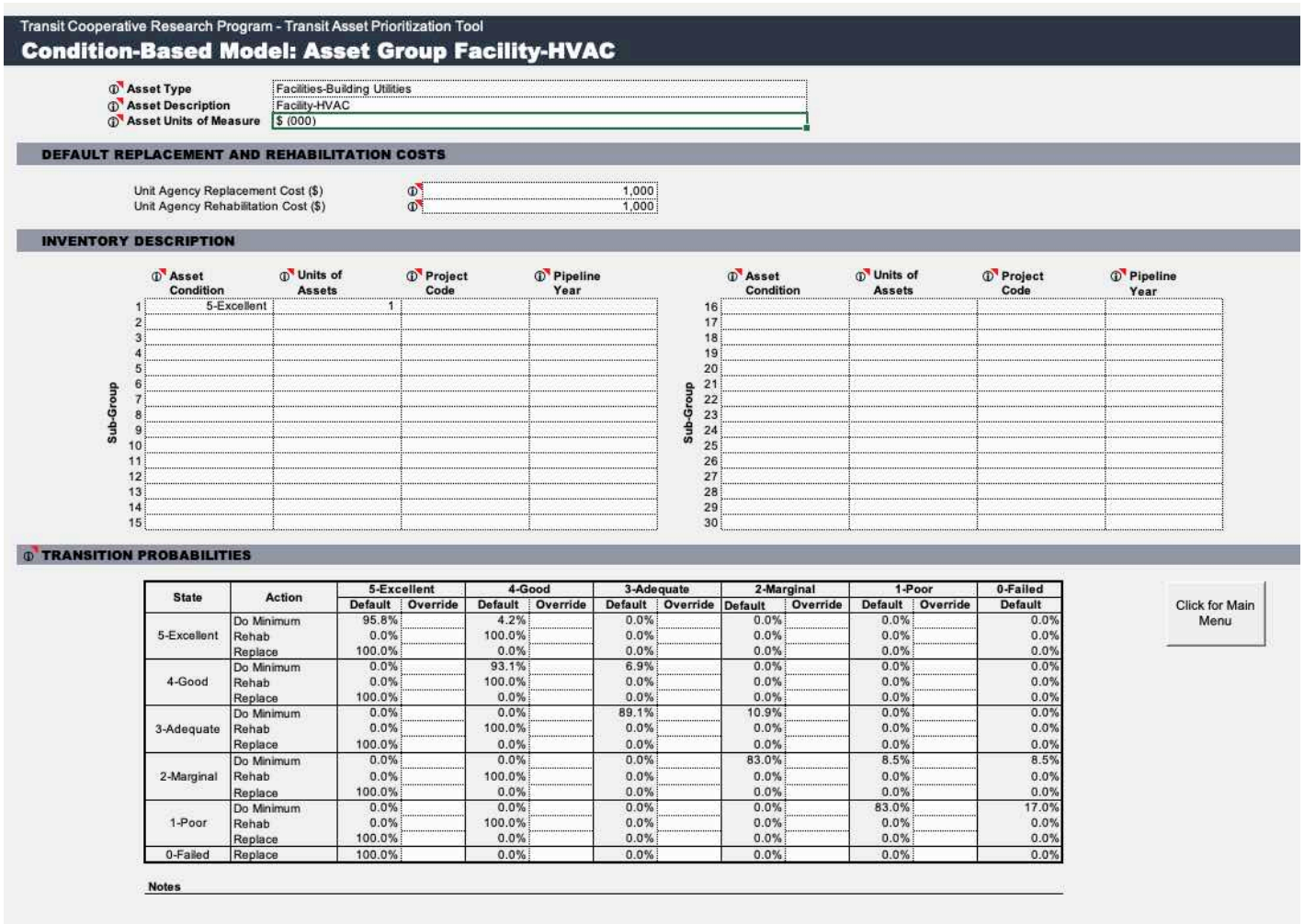
Figure 4-3. TAPT Start Screen

Figure 4-4 illustrates specification of an asset model. In this case a condition-based model is shown. The user specifies the quantity and condition of each asset of a specified type, a transition probability matrix that describes how the asset will deteriorate (or improve in the event an action is performed), and additional cost data (not shown in this screenshot).

The outputs generated using TAPT include lifecycle models for each asset type, a recommended policy specifying the point at which the asset should be rehabilitated or replaced, and predictions of future conditions as an asset ages. The prioritization model uses the asset-specific results to predict future conditions and recommend work given a budget.

"Pipeline Projects"

Alternatively, one can enter a specific set of asset rehabilitation/replacement actions ("pipelined" projects) and view the predicted conditions and performance over time without using the prioritization model to determine when these actions will be implemented.



Transit Cooperative Research Program - Transit Asset Prioritization Tool

Condition-Based Model: Asset Group Facility-HVAC

Asset Type	Facilities-Building Utilities
Asset Description	Facility-HVAC
Asset Units of Measure	$ (000)

DEFAULT REPLACEMENT AND REHABILITATION COSTS

Unit Agency Replacement Cost ($)	1,000
Unit Agency Rehabilitation Cost ($)	1,000

INVENTORY DESCRIPTION

Sub-Group	Asset Condition	Units of Assets	Project Code	Pipeline Year
1	5-Excellent	1		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Sub-Group	Asset Condition	Units of Assets	Project Code	Pipeline Year
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

TRANSITION PROBABILITIES

State	Action	5-Excellent		4-Good		3-Adequate		2-Marginal		1-Poor		0-Failed
		Default	Override	Default	Override	Default	Override	Default	Override	Default	Override	Default
5-Excellent	Do Minimum	95.8%		4.2%		0.0%		0.0%		0.0%		0.0%
	Rehab	0.0%		100.0%		0.0%		0.0%		0.0%		0.0%
	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
4-Good	Do Minimum	0.0%		93.1%		6.9%		0.0%		0.0%		0.0%
	Rehab	0.0%		100.0%		0.0%		0.0%		0.0%		0.0%
	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
3-Adequate	Do Minimum	0.0%		0.0%		89.1%		10.9%		0.0%		0.0%
	Rehab	0.0%		100.0%		0.0%		0.0%		0.0%		0.0%
	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
2-Marginal	Do Minimum	0.0%		0.0%		0.0%		83.0%		8.5%		8.5%
	Rehab	0.0%		100.0%		0.0%		0.0%		0.0%		0.0%
	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
1-Poor	Do Minimum	0.0%		0.0%		0.0%		0.0%		83.0%		17.0%
	Rehab	0.0%		100.0%		0.0%		0.0%		0.0%		0.0%
	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%
0-Failed	Replace	100.0%		0.0%		0.0%		0.0%		0.0%		0.0%

Click for Main Menu

Notes

Figure 4-4. TAPT Model Example

The TAPT modeling approach incorporates the three different asset-level models noted above, as well as a prioritization model that integrates the asset-level models and simulates the allocation of resources to address SGR needs over time and across asset types. Below is a brief description of each of these:

- **Vehicle Model:** the revenue vehicle model takes as input data items reported by urban transit agencies to the NTD specified for a given fleet of vehicles, such as vehicle mileage, revenue passenger miles, maintenance costs, energy consumption and mechanical failures. The model then predicts agency, user and external costs, and mean distance between failures (MDBF) as a function of vehicle mileage. Further, it calculates the mileage at which a given vehicle should be replaced to minimize lifecycle costs, and the increased lifecycle costs that will result each year a needed replacement is deferred. The model includes default assumptions for growth in maintenance costs, rehabilitation costs and failures that are calibrated based on model inputs. Alternatively, one may override the default assumptions.
- **Condition-Based Model:** this model, which is technically a Markovian Decision Model, may be used to model any asset. It predicts the lifecycle agency, user and external costs associated with an asset, as well as the optimal point to perform rehabilitation or replacement, and the increase in lifecycle costs of deferring action. An asset is modeled as existing in one of a number of different condition states (in this case, using the five-point condition scale from TERM), and a set of transition probabilities describes the likelihood of transition from a given state to another given either the asset deteriorates or some action is taken. The model determines the optimal policy, or set of actions to take as a function of condition, to minimize agency, user and external costs. Further, the model explicitly calculates the cost of deferring a recommended action in terms of the increased lifecycle cost resulting from

action deferral. Model defaults are provided for each asset type defined in TERM using TERM data.

- **Age-Based Model:** like the condition-based model, this is a generic model that can be used to model any asset. However, the condition-based model is recommended over this model where condition data are available. In the age-based model, asset rehabilitation or replacement is motivated by the gradually increasing cost of asset maintenance, as well as increasing likelihood of asset failure. This likelihood is modeled using a Weibull distribution. Using the model requires data on asset age, and the model outputs are essentially the same as those produced using the condition-based model.
- **Prioritization Model:** in TAPT asset rehabilitation/replacement is prioritized with an objective of minimizing lifecycle agency, user and external costs subject to a budget constraint. To accomplish this objective, the model establishes candidate rehabilitation/replacement actions, and calculates the costs and impacts of these using the asset-level models. The model then prioritizes potential investments in decreasing order of Prioritization Index (PI), where the PI is defined as the change in lifecycle cost resulting from delaying an action one year relative performing it in the specified year divided by the action cost. In concept the PI is a benefit cost ratio. However, one may tailor the prioritization function to change the weight of different types of benefits and/or specify an additional benefit realized from replacing an asset over and above that modeled by the asset-level models.

See TCRP Report 172 for a detailed description of TAPT, guidance on how to use the spreadsheet tool, and two tutorials using example data.

Implementing the Tool at CTDOT

This section provides additional details on the revisions made to support CTDOT's use of TAPT. The revisions include creating new screens for refining inventory data and changing underlying code in TAPT to relax some of the tool's constraints.

Screens for Editing Inventory Data

A major change to TAPT is the addition of screens for importing vehicle data and facility data from the Transit Asset Management Database (and/or other systems). With this functionality the tool user can quickly enter data on a set of vehicle fleets and facilities.

Figure 4-3 illustrates the start screen for the CTDOT version of TAPT providing access to the inventory screens. Relative to the default, this version of the tool includes a new section labeled "Asset Inventory" for two new buttons providing access to the new screens. Figure 4-5 shows a section of the vehicle inventory screen. This screen has one row for each fleet exported from the Transit Asset Management Database. A fleet is a subgroup of vehicles that are operated by the same transit provider and have the same manufacturer, model, and model year. The user can edit the following fields for each fleet, either using imported data or overriding it as appropriate:

- **Fleet ID.** This is formed by concatenating the agency name and a sequence number, both of which can be edited.
- **Vehicle description.** This is formed from Transit Asset Management Database data by concatenating the model year, manufacturer and model.
- **Vehicle Useful Life (miles).** The ULB for the fleet in miles, if defined (by default this is not used).
- **Vehicle Useful Life (years).** The ULB for the fleet in year. This is defined by CTDOT by vehicle type.

- **Vehicle type.** This field specifies which specific vehicle model to use of the types defined in CTDOT's asset hierarchy.
- **Model year.** This is formed from Transit Asset Management Database data and used to calculate vehicle age.
- **Total current miles/hours.** This is an optional field and is not populated by default. If populated it is used to calculate an effective age for the fleet.
- **Number of vehicles.** This is the number of vehicles in a fleet and is formed from Transit Asset Management Database data.
- **Condition.** The condition of the fleet, measured using the 1-5 TERM scale. This is an optional field and is not populated by default. If populated it is used to calculate an effective age for the fleet.
- **Vehicle age.** This is calculated based on model year or date vehicle is placed into service. Vehicle condition is provided to assist in evaluating effective age.
- **Project code.** This is an optional field that can be used to identify a known project.
- **Pipeline year.** This is an optional field that can be used to identify a specific year when the vehicle will be replaced.
- **Indicator of whether or not to include the vehicle in the modeling.** Vehicles may be excluded if data are incomplete, or if the vehicle is modeled through a separately-defined asset group model.

Transit Cooperative Research Program - Transit Asset Prioritization Tool (modified for DOT use)

Vehicle Inventory

Agency	ID Default	Override	Description	Vehicle Useful Life (miles)	Vehicle Useful Life (years)	Vehicle Type	Model Year	Total Current Miles/Hours	Num. Vehicles	Condition	Age Model Year
ETD	1		2010 Ford E450			Cutaway Bus	2010		1		8
ETD	2		2010 Ford E450			Cutaway Bus	2010		2		8
ETD	3		2011 Ford Startrans			Cutaway Bus	2011		1		7
ETD	4		2012 Ford F550			Cutaway Bus	2012		1		6
ETD	5		2012 Ford Goshen E450			Cutaway Bus	2012		1		6
ETD	6		2012 Ford Phoenix			Cutaway Bus	2012		1		6
ETD	7		2012 Ford Startrans E450 28 FT			Cutaway Bus	2012		1		6
ETD	8		2013 Ford E450			Cutaway Bus	2013		2		5
ETD	9		2013 Ford Goshen E450 28 FT			Cutaway Bus	2013		1		5
ETD	10		2013 Ford Goshen F550			Cutaway Bus	2013		1		5
ETD	11		2015 Ford E450 Phoenix			Cutaway Bus	2015		4		3
GBTA	1		2012 Ford Goshen			Cutaway Bus	2012		4		6
GBTA	2		2017 Dodge Braun			Cutaway Bus	2017		2		1
GBTA	3		2017 Ford Startrans			Cutaway Bus	2017		24		1
GBTA	4		2003 New Flyer			Transit Bus	2003		2		15
GBTA	5		2003 New Flyer			Transit Bus	2003		3		15
GBTA	6		2011 New Flyer			Transit Bus	2011		2		7

Figure 4-5. Connecticut TAPT Vehicle Inventory

The facility inventory is similar in concept to the vehicle inventory. For each facility defined, the screen allows specification of the following items:

- **Facility ID.** This is formed by concatenating the agency name, facility description and a sequence number, all of which can be edited.
- **Condition.** This is specified for ten facility systems – substructure, shell, interior, conveyance, plumbing, HVAC, fire protection, electrical, equipment, and site.
- **Construction year.** This field is used to calculate facility age.
- **Quantity.** This must be specified separately by system, and is typically either the roof area, floor area, or site area.
- **Project code.** This is an optional field that can be used to identify a known project.
- **Pipeline year.** This is an optional field that can be used to identify a specific year when the facility will be replaced/rehabilitated.
- **Indicator of whether or not to include the facility in the modeling.** Facilities may be excluded if data are incomplete, or if the vehicle is modeled through a separately-defined asset group model.

Note that each facility is modeled as a set of ten assets in TAPT, with one asset defined for each of the ten facility systems listed above.

Other TAPT Revisions

Several further revisions were made in TAPT to relax certain constraints in the tool. Specific changes made in this regard include the following:

- The tool was revised to allow modeling of assets listed on the new inventory pages without providing the same level of detail required for developing asset group models. For these assets it is necessary to specify certain basic data outlined above, including specification of what asset group model should be used. Preexisting TAPT functionality is used to develop the asset group models. By default, TAPT is constrained to model only those assets listed in the group model pages.
- The handling of assets excluded from prioritization runs was revised. The preexisting version of the tool allowed for specifying that assets used for building an asset group model should be excluded from prioritization. However, if this option was used both the asset and the model were excluded; in other words, selecting this option was equivalent to deleting the model entirely. For CTDOT, it is desirable to define asset group models, and then use the models without including the specific assets included in developing the model (as they may already be included in the data imported from Transit Asset Management Database). The tool was revised to support this approach.
- The tool was revised to model up to 5,000 assets, including 3,000 assets listed on the vehicle inventory pages, 1,000 assets listed on the facility inventory page (10 systems for each of 100 facilities), and 1,000 other assets that may be defined as part of the asset group models. The preexisting version of the tool was constrained to model only 1,000 assets. Likewise, the page size was increased for display of model results considering the increase in number of assets.

Modeling Assumptions for Connecticut Transit Assets

This section describes key modeling assumptions and parameters by asset category for Group TAMP assets.

Revenue Vehicles. For buses prototype models were developed for the bus types identified in Chapter 3 using the TAPT vehicle model. These models were then calibrated such that replacement is recommended at the ULB value specified for CTDOT. Vehicle replacement costs were established by adjusting the costs established for the 2018 TAMP based on analysis of recent construction cost inflation in Connecticut.

Facilities. The TAPT condition-based model was used to define models for each of the major facility components defined in Chapter 3. In the tool assets were created for each facility component of each building. Platforms were treated as an additional facility component. TAPT defaults (which are in turn derived from those in TERM) were used to predict deterioration rates for each facility component.

Regarding facility costs, the average cost per square foot was determined for passenger buildings and administrative/maintenance facilities by averaging inflation-adjusted historic construction costs. CTDOT staff estimated the percentage of the overall facility cost attributed to each facility component.

Service Vehicles. TAPT age-based models were developed for the different types of service vehicles defined in Chapter 3. TAPT defaults were used, calibrating these to CTDOT's established ULB values. Vehicle replacement costs were established by adjusting the costs established for the 2018 TAMP based on analysis of recent construction cost inflation in Connecticut.

Business Processes to Support the Tool

Although the use of TAPT is an important element of the development of the Group-TAMP, in reality its use is just one of a number of steps in the decision-making process for capital planning. The business process for performing the analysis of SGR needs and using this to develop the capital plan is as follows:

- First, TAPT is populated with available data on the asset inventory, its condition, treatments costs, and other data.
- Next, projects that are in progress or planned in the near term are entered in TAPT as "pipelined" projects. This forces the system to rehabilitate or replace these assets in the specified year.
- Next, initial runs are performed in the system. This generates a set of predicted conditions at different budget levels, as well as a prioritized list of SGR investments recommended in each year.
- The initial model results are reviewed to identify issues in the data, such as incorrectly coded ages, cases where there are additional known investments that need to be pipelined, and/or other issues.
- TAPT is then rerun, generating a new set of results and priorities.
- CTDOT next revises its capital plan using data from TAPT to help inform its decision-making. However, the work that is actually planned may differ significantly from that recommended by TAPT for a variety of reasons. These include:
  - Bundling of related needs differently than that modeled by the system. For instance, if work on a facility is performed, then all work needed would generally be performed given the costs associated with initiating a project. TAPT might recommend work on one facility system one year, to be followed by work on another system in a subsequent project.

  - Differences in costs. TAPT is populated with average unit costs, but the costs for a given project may be greater or less than the average.
  - Need for geographical equity. TAPT does not consider the need to balance investments between different areas or regions, but this is an important factor in "real world" decisions.
  - Limitations in uses of funding. TAPT models a budget as a single fund that can be used without limitation for any project. In reality CTDOT derives funding from multiple sources and there are various stipulations on the use of those funds that must be considered in developing the capital plan. For instance, some funds may be available only for certain asset types, or certain types of work.
  - CTDOT staff incorporated many additional factors and perspectives in prioritizing needs beyond those captured in any model.
- Once the capital plan is revised, the prioritized list of needs generated by TAPT is revised based on actual project plans.

The end result of the above process is a capital plan that reflects available funding and incorporates TAPT priorities to the extent feasible. The process also yields a prioritized list of SGR needs that helps inform decisions concerning where additional and/or future investment should be directed. The final list of prioritized needs included in this Group-TAMP is a product of the staff judgement, TAPT analysis, and institutional experience.

Chapter 5

Investment Scenarios

Developing investment scenarios at various funding levels enables CTDOT to evaluate funding priorities. The investment scenarios show projected needs and work across the three asset categories in the Group-TAMP. While CTDOT and Connecticut transit providers are making progress towards performance targets at current funding levels, the investment scenarios demonstrate a need for additional funding to achieve SGR.

Overview

This chapter describes the estimated funding available for Tier II transit providers in Connecticut, the estimated uses for that funding, projected asset investment needs, and projected capital projects based on funding scenarios. Funding for transit in Connecticut comes from a mix of federal and state sources. As described in Chapter 4, CTDOT uses TAPT to model asset conditions and predict investments needed to achieve and maintain SGR.

Federal Requirements

In 49 CFR 625.25, FTA requires than a group TAM plan include a "provider's project-based prioritization of investments." The investment prioritization must "take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the group TAM plan horizon period."

Funding for Transit at CTDOT

Funding for transit in Connecticut historically comes primarily from FTA funds, with the remainder coming from state public transportation bonds. Connecticut public transportation bond funds are used to match federal funds and provide funding for 100% state projects.

Transit funding sources at CTDOT and the bonding process are discussed in detail in CTDOT's Annual Capital Plan Report. Estimated funding sources for transit over the four-year period of the Group-TAMP, organized by source, are shown in Table 5-1.

Table 5-1. Summary of Estimated Funding for Transit

	Value by Fiscal Year ($M) in current dollars			
Description	2022	2023	2024	2025
Federal Funds	$265	$254	$257	$261
State Funds (Bonds Authorized) *	$248	$271	$271	$271
Total Funding	$513	$525	$528	$532

*Combination of State Federal Match and 100% State Bonded Projects.

Federal funds for transit come from a number of FTA grant programs, including:

- Section 5305 – Planning Programs
  - 5305(d) Metropolitan Planning
  - 5305(e) State Planning and Research
- Section 5307 – Urbanized Area Formula Funding
- Section 5310 - Enhanced Mobility of Seniors & People with Disabilities
- Section 5311 – Formula Grants for Rural Areas
  - SEC 5311(b)(3) Rural Transportation Assistance Program
- Section 5337 – State of Good Repair Grants Program
- Section 5339 - Bus & Bus Facilities Infrastructure Investment Program

These program section titles correspond to the sections of the US Code in which each program is defined. A breakdown of all estimated federal formula funding for Connecticut by FTA program is shown in Table 5-2, including funding expected from the BIL.

Table 5-2. Summary of Estimated Connecticut Share of FTA Programs

Description	Value by Fiscal Year ($M) in current dollars 2022	2023	2024	2025
SEC 5305(d)	$1.6	$1.6	$1.6	$1.7
SEC 5305(e)	$0.4	$0.4	$0.4	$0.4
SEC 5307	$134.9	$136.9	$139.0	$141.1
SEC 5310	$4.8	$4.9	$5.0	$5.1
SEC 5311	$4.2	$4.3	$4.3	$4.4
SEC 5311(b)(3)	$0.2	$0.2	$0.2	$0.2
SEC 5337 (High Intensity Fixed Guideway)	$93.6	$95.0	$96.4	$97.8
Hartford	$0.5	$0.5	$0.5	$0.5
Southwestern	$93.1	$94.5	$95.9	$97.3
SEC 5337 (High Intensity Motorbus)	$1.6	$1.7	$1.7	$1.7
Hartford	$1.6	$1.7	$1.7	$1.7
SEC 5339	$8.5	$8.6	$8.7	$8.8
Congressionally Directed	$15.0	$0.0	$0.0	$0.0
WALK Bridge	$15.0	$0.0	$0.0	$0.0
Total	**$264.8**	**$253.5**	**$257.3**	**$261.2**

To help generate investment scenarios for transit assets, the funding by program has been restructured to show funding by use. A summary of estimated funding uses for transit over the four-year period of the Group-TAMP, organized by mode, is shown in Table 5-3 below. This table includes all federal funding, split by uses for SGR and other activities. Funding for non-SGR activities was excluded from the TAPT Model.

Funds are split between Tier I bus, Tier II bus and rail. Statewide bus funding for the investment scenarios comes from Sections 5307, 5311, 5337, 5339; and earmarks. The Section 5337 funding for Hartford is fixed guideway funding and can be used on CTfastrak and approximately 65% of Section 5307 funding is programmed for bus projects, based on historical trends. The estimates of funding by mode shown in Table 5-3 were calculated based on the January 2022 CTDOT Capital Plan, which did not include BIL funding. The Capital Plan is included in Appendix E.

Table 5-3. Summary of Estimated Funding Uses for Transit

Description	Value by Fiscal Year ($M) in current dollars 2022	2023	2024	2025
Bus – Tier I	$104	$18	$78	$85
SGR	$80	$4	$72	$68
Other Uses	$25	$14	$6	$17
Bus – Tier II	$69	$77	$65	$37
SGR	$23	$29	$20	$22
Other Uses	$46	$48	$45	$15
Rail	$795	$720	$425	$466
SGR	$671	$640	$410	$461
Other Uses	$124	$80	$15	$5
5310 Program	$5	$5	$5	$5
Total	$973	$819	$573	$593

Note that because total estimated funding uses shown in Table 5-3 do not include BIL funding, while the available funding shown in Tables 5-1 and 5-2 does include BIL funding, the funding data do not fully align.

Also, Tables 5-1 and 5-2 report new funds made available to the State each year, while Table 5-3 shows funds programmed by year, including carryforward amounts and prior year funds released from older projects.

Note that the funding shown as SGR-related is limited to funding for rehabilitation or replacement of existing assets that are included in the TAMP. One challenge in estimating this value is that improvement projects are not classified as SGR-related, but nonetheless may include work that improves asset conditions. For example, a facility improvement project may expand a facility and add new features (non-SGR activities), while also repairing the HVAC and roof (SGR activities).

In addition, some activities funded by CTDOT clearly are motivated by a need to maintain existing assets in good repair, but include assets that are not explicitly included in the TAMP, and thus not classified as SGR-related. For example, bus shelters are not explicitly included in the asset inventory, and not addressed in the TAMP. While

CTDOT does invest in maintaining these assets, these investments are not classified as SGR-related in the table.

Current Estimated Investment Needs

Current capital investment needs for Tier II assets for 2022 are approximately $58 million. Figure 5-1 shows these investment needs for 2022, broken down by asset category. Rolling stock constitutes 63% of the need, facilities constitute 30%, and equipment constitutes 7%. The rolling stock need is driven by the relatively higher cost of purchasing battery electric buses as part of Connecticut's transition to an electric bus fleet.

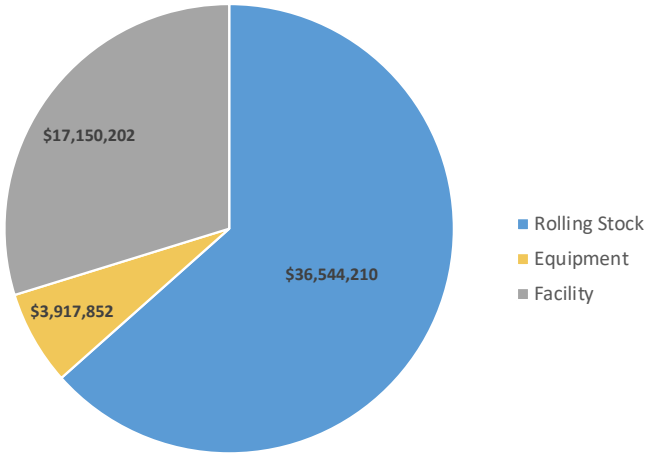


Figure 5-1. Estimated Investment Needs by Asset Category in 2022 (Tier II)

Investment Scenarios

This section builds on the estimated available funding to define investment scenarios to help identify and prioritize state of good repair investments in Tier II capital assets.

Each investment scenario is generated by modeling transit needs using a certain funding level, or budget. The budget is the variable input. TAPT models only certain SGR activities, so the corresponding budget should only include funding directed to those activities.

Modeling SGR Needs

TAPT only models certain SGR needs. There are additional needs beyond SGR needs addressed in the capital program, and additional SGR needs short of capital replacement that are addressed in capital and operating budgets.

The Group-TAMP includes the following investment scenarios:

- Scenario 1 – No Funding
- Scenario 2 – Expected Funding
- Scenario 3 – Achieve SGR

The "No Funding" scenario assumes no available funding for SGR-related activities. This scenario is used to demonstrate how asset conditions would decline in the absence of continued investment.

The "Expected Funding" scenario includes all funding expected to be available for Tier II SGR activities over the period of the plan. These values were calculated by reviewing the 2022 Capital Plan and tagging investments as SGR and Tier II. This scenario is the same as the estimated SGR funding identified in Table 5-3.

The "Achieve SGR" scenario includes funding levels required to achieve SGR targets for Tier II assets over the period of the plan. Funding increases at the level of inflation (assumed to be 3.5% annually) resulting in flat funding when measured in constant dollars.

The values presented in Table 5-4 are the budgets used for modeling SGR investments in TAPT for the Group-TAMP.

Table 5-4. Modeled Tier II SGR Funds by Scenario

Description	Value by Fiscal Year ($M) in current dollars				
	2022	2023	2024	2025	Annual Average (2022-2025)
Bus					
No Funding	$0	$0	$0	$0	$0
Expected	$23.4	$28.6	$19.5	$21.9	$23.3
Achieve SGR	$30.0	$31.1	$32.1	$33.3	$31.6

The following sections present the investment scenario results. Modeled work consists of major capital investments in SGR for transit assets. For vehicles, this means fleet replacement. For other assets, it means major rehabilitation or replacement.

Investment Needs and Work

No Funding Scenario

Estimated investment needs and projected work in the No Funding scenario are shown in Figure 5-2. Without any investment, needs would grow from $58 million in 2022 to approximately $128 million in 2025.

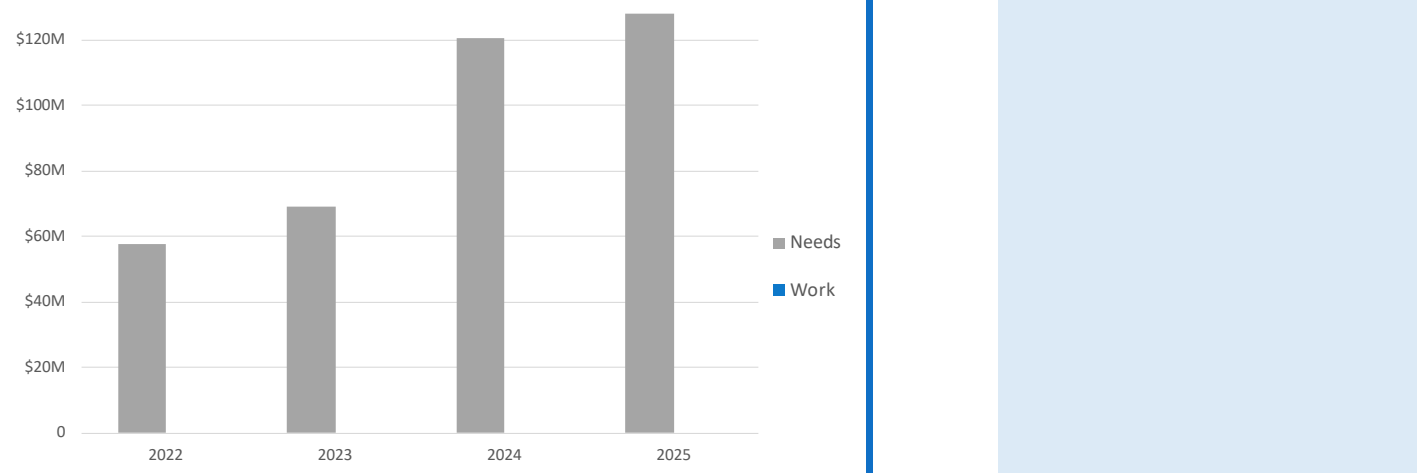


Figure 5-2. Estimated Investment Needs and Work, No Funding Scenario

Expected Funding Scenario

Estimated investment needs and projected work in Scenario 2 are shown in Figure 5-3. The figure shows that spending an average of $23 million per year would reduce the backlog of needs to approximately $30 million dollars at the end of 2025.

Note that the scale of the y-axis in Figures 5-3 and 5-4 is different from that of Figure 5-2.

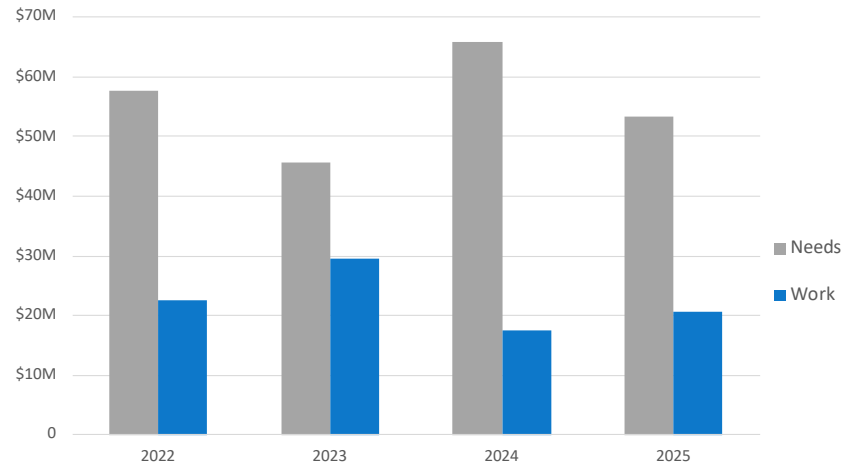


Figure 5-3. Estimated Investment Needs and Work, Expected Funding Scenario

Achieve SGR Scenario

Estimated investment needs and projected work in Scenario 3 are shown in Figure 5-4. In this scenario spending is increased to approximately $30 million per year, resulting in elimination of the backlog of SGR needs by the end of 2025.

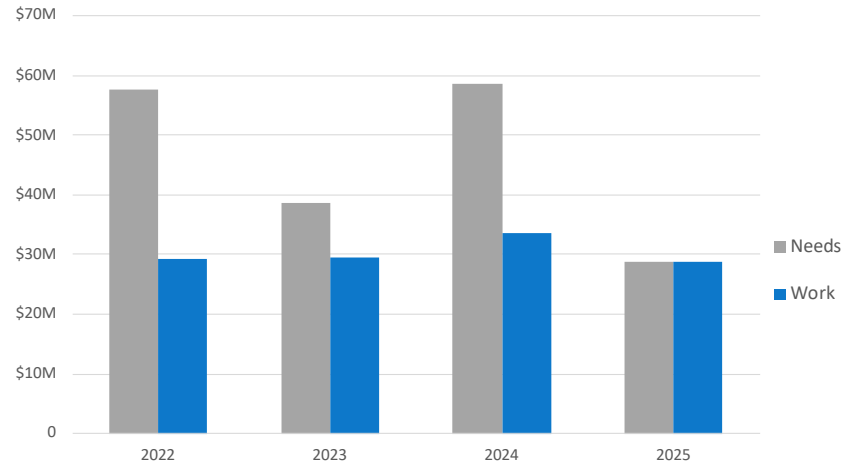


Figure 5-4. Estimated Investment Needs and Work, Achieve SGR Scenario

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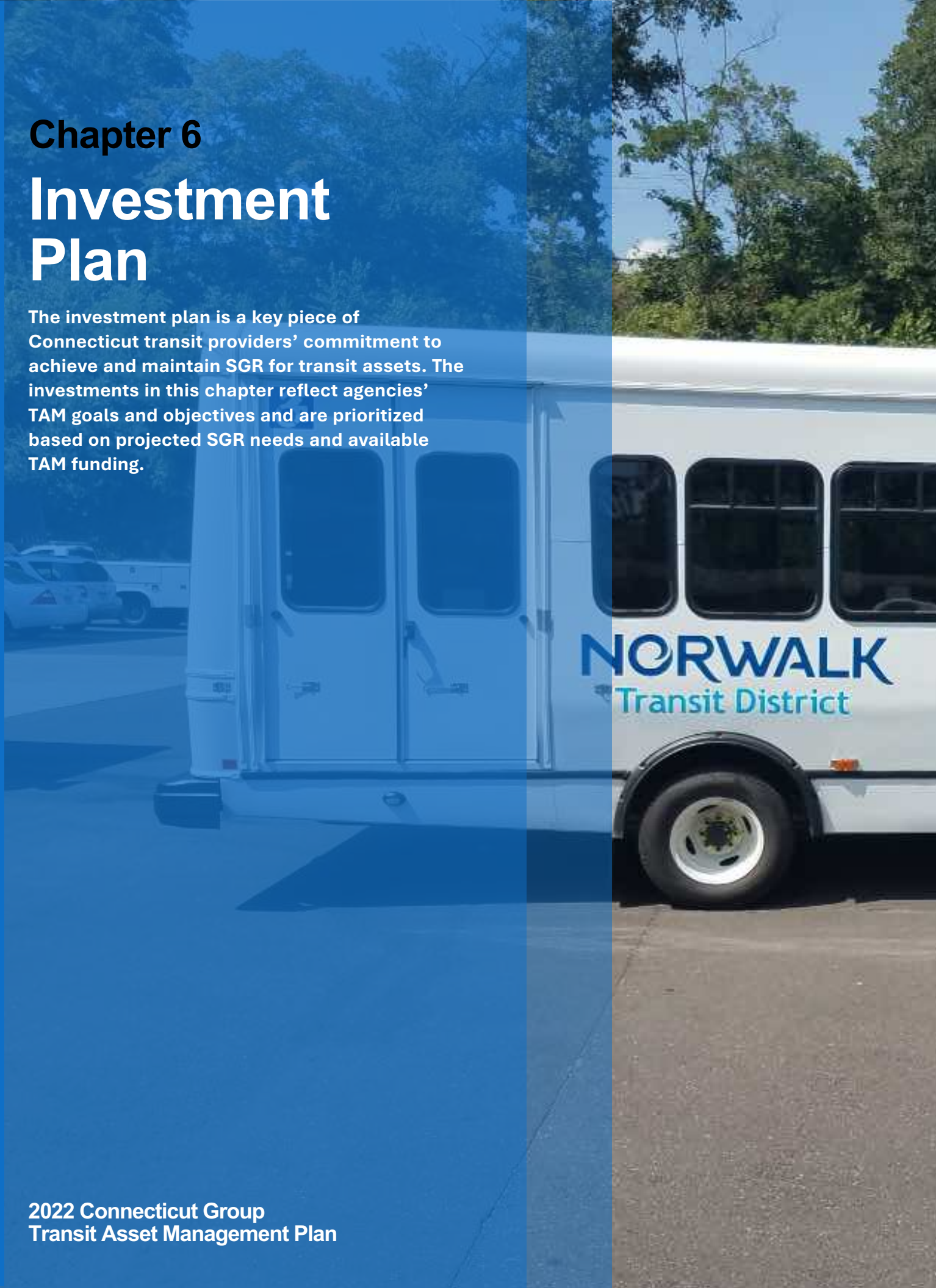
Chapter 6

Investment Plan

The investment plan is a key piece of Connecticut transit providers' commitment to achieve and maintain SGR for transit assets. The investments in this chapter reflect agencies' TAM goals and objectives and are prioritized based on projected SGR needs and available TAM funding.



Overview

This chapter describes the current capital planning process at CTDOT and Tier II transit providers and presents a prioritized list of SGR investments. Incorporating the inventory and condition data summarized in Chapter 3 into the analytical approach described in Chapter 4, CTDOT has modeled asset performance and investment needs. The list of prioritized investments is an output of TAPT and is aligned with the planned funding of Tier II assets presented in the capital plan.

Federal Requirements

In 49 CFR 625.25, FTA requires that a TAM plan include a "provider's project-based prioritization of investments." FTA defines investment prioritization as "a transit provider's ranking of capital projects or programs to achieve or maintain a state of good repair. An investment prioritization is based on financial resources from all sources that a transit provider reasonably anticipates will be available over the TAM plan horizon period."

In 49 CFR 625.33, FTA requires that a transit provider must consider the following when developing the investment prioritization:

- Projects to improve an identified unacceptable safety risk
- Estimated available funding for TAM projects
- Requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities

Projects must be ranked in order of priority and anticipated project year, and project rankings must be consistent with agency TAM policy and strategies.

Capital Planning Process

This section presents a summary of the statewide transit capital planning process and how funds are allocated to Tier II providers.

CTDOT provides public transportation services, both bus and rail, to the citizens of Connecticut through contract agreements with numerous operators, including bus transit districts, CT*transit*, private bus operators, and railroads. CTDOT is responsible for providing the capital investment required to operate these services along with the necessary operating assistance.

Since 1984, CDOT has had a comprehensive transit capital plan. The plan has been updated, expanded, and improved over the years and formal procedures have evolved. The current capital plan combines transit and highway projects and is referred to as the Transportation Capital Infrastructure Program. The plan identifies and programs all transit capital projects for the next five years and includes an estimated cost for each project. The plan is fiscally constrained and it forecasts and programs the capital needs associated with all bus and rail capital projects administered or approved by the Bureau of Public Transportation. This includes all capital projects necessary to support the commuter railroads, CT Transit operations, and transit districts. The plan assigns total estimated project costs and anticipated funding sources to each project.

Funds are programmed to invest in projects that ensure safety, maintain the existing transportation infrastructure, increase the productivity of the transportation system, promote economic development, provide necessary capacity enhancements, and effectively utilize all federal and state funds.

Meetings are held monthly with bus and rail staff to discuss proposed revisions to the Plan including new projects, revised project scopes, revised costs, and/or revised schedules. Strategies and project priorities are reviewed, and the plan is amended to reflect the outcome of each meeting. In addition,

the meetings provide a forum for addressing emergency situations.

CTDOT and the large urbanized areas are designated recipients for FTA programs and are responsible for service and planning decisions for rail, fixed-route bus and complementary paratransit service in the urbanized and rural areas of the state. CTDOT, the transit districts, and MPOs work together to develop a project list which is then prioritized. CTDOT creates a funding pool from which capital projects in regions around the state are funded. CTDOT does not utilize a formula to reallocate Section 5307 formula funds to the bus operators; rather, the funding pool allows for a cooperative, nondiscriminatory allocation of funds to different regions based on annual needs. The disbursement of these funds is approved by the MPOs in the Statewide Transportation Improvement Program (STIP). Sub-area split agreements that reflect the annual disbursement of funds by region are created by CTDOT and executed by the operators from each region. This program allows local transit operators to fund major projects for which they may otherwise have never accumulated adequate funds.

Also, Section 5310 funds capital and operating expenses for programs to serve the special needs of transit dependent populations and enhances mobility for seniors and persons with disabilities. CTDOT conducts a competitive selection process for the Section 5310 grant program. Annually, applications are made available to eligible recipients which are reviewed and prioritized for award by CTDOT and the Regional Councils of Government.

Ideally, CTDOT's capital plan should address all of the SGR-related needs of CTDOT's transit providers. Thus, this plan summarizes the funding levels specified in the capital plan. Given that a backlog of needs is predicted even with the investments in the capital plan, this TAMP also provides a prioritized list of additional SGR needs not addressed in the capital plan.

Recommended Work by Category

This section presents more detailed results of the investment scenarios introduced in Chapter 5. The following figures show the projected Tier II work recommended by the TAPT model over the four year period of the Group-TAMP, organized by asset category. The TAPT model scenario results are included in Appendix F.

Note that no additional information is presented for the No Funding scenario, as no work is planned for this scenario.

Expected Funding Scenario

In the Expected Funding scenario, rolling stock work makes up the majority of projected spending. Rolling stock work constitutes 54% of estimated transit asset management spending on the bus mode over the four-year period of the plan, while facilities and equipment constitute 41% and 5%, respectively. A breakdown of the expected work by asset category in Scenario 2 is shown in Figure 6-1.

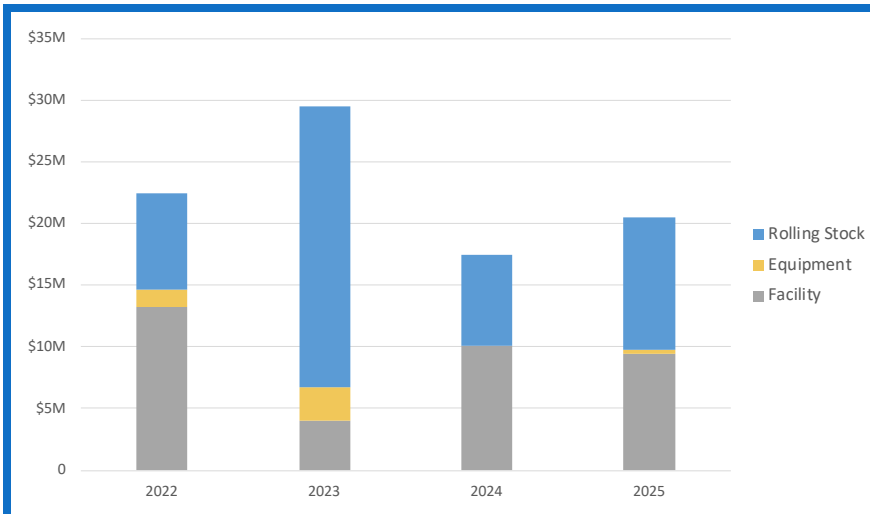


Figure 6-1. Recommended Work by Asset Category, Expected Funding Scenario

Achieve SGR Scenario

In the Achieve SGR scenario, rolling stock work makes up the majority of projected spending. Rolling stock work constitutes 66% of estimated transit asset management spending on the bus mode over the four-year period of the plan, while facilities and equipment constitute 30% and 4%, respectively. This includes $32 million more invested in revenue vehicles than in the Expected Funding scenario. A breakdown of the expected work by asset category in the Achieve SGR scenario is shown in Figure 6-2.

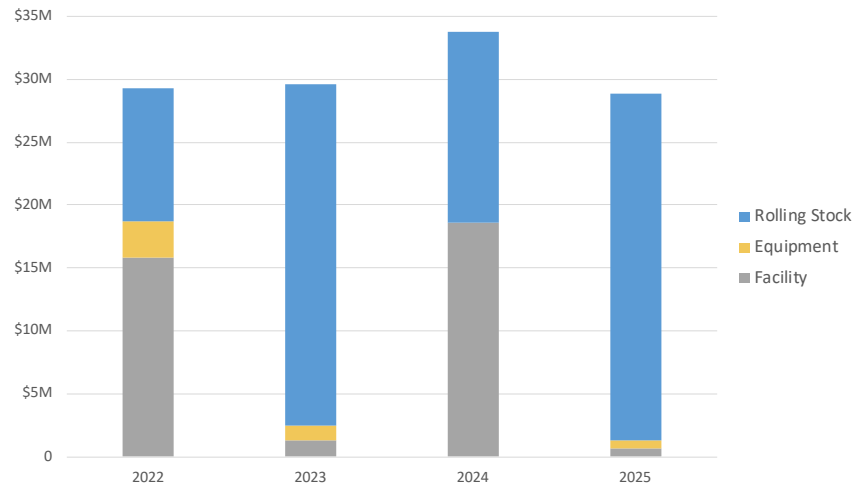


Figure 6-2. Recommended Work by Asset Category, Achieve SGR Scenario

Predicted Asset Performance

The estimated impact of the recommended work on asset condition is summarized by asset category in Figures 6-4 thru 6-6. Each figure shows the current performance of each asset class, and predicted performance by Fiscal Year from 2022-2025 for each funding scenario. 2021 is shown as the current condition of each asset class. Note that for some assets and scenarios, performance is the same across multiple scenarios, meaning that performance lines may not be visible in figures. Performance scenario data is included in Appendix G.

Figure 6-3 shows predicted performance for bus rolling stock. The performance measure on the y-axis is the percent of vehicles at or exceeding the ULB.

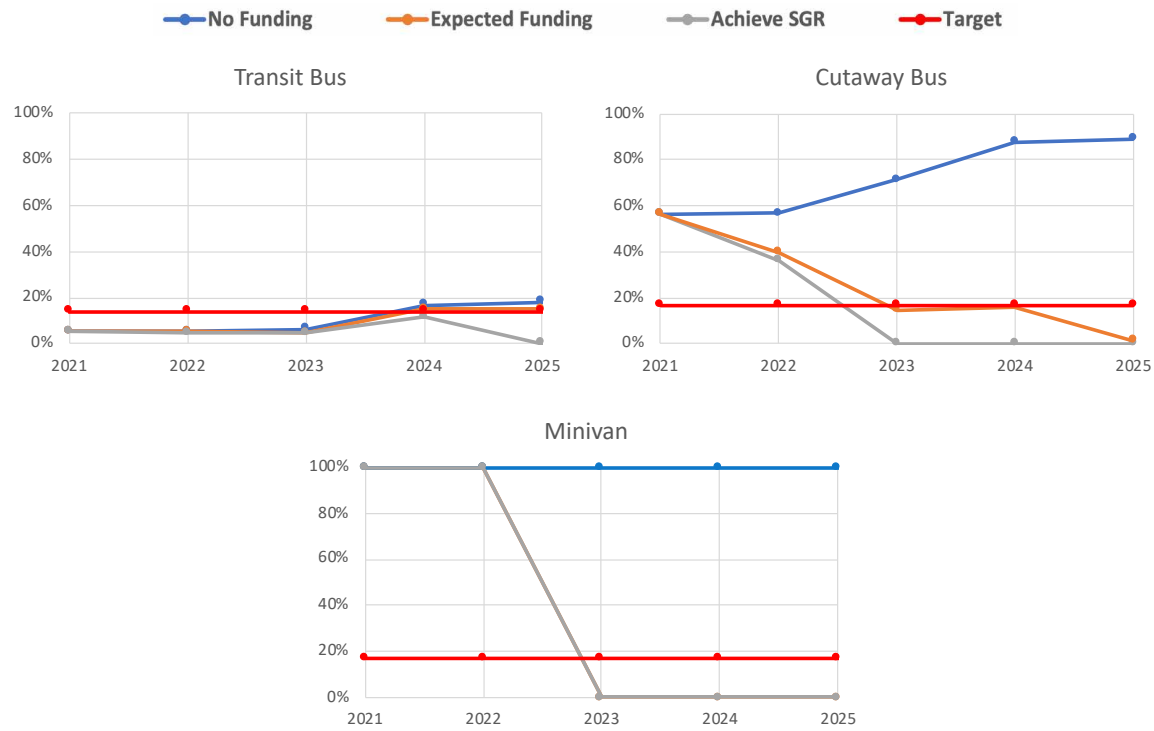


Figure 6-3. Predicted Performance for Tier II Bus Rolling Stock

Figure 6-4 shows predicted performance for Tier II equipment. The performance measure on the y-axis is the percent of vehicles at or exceeding the ULB.

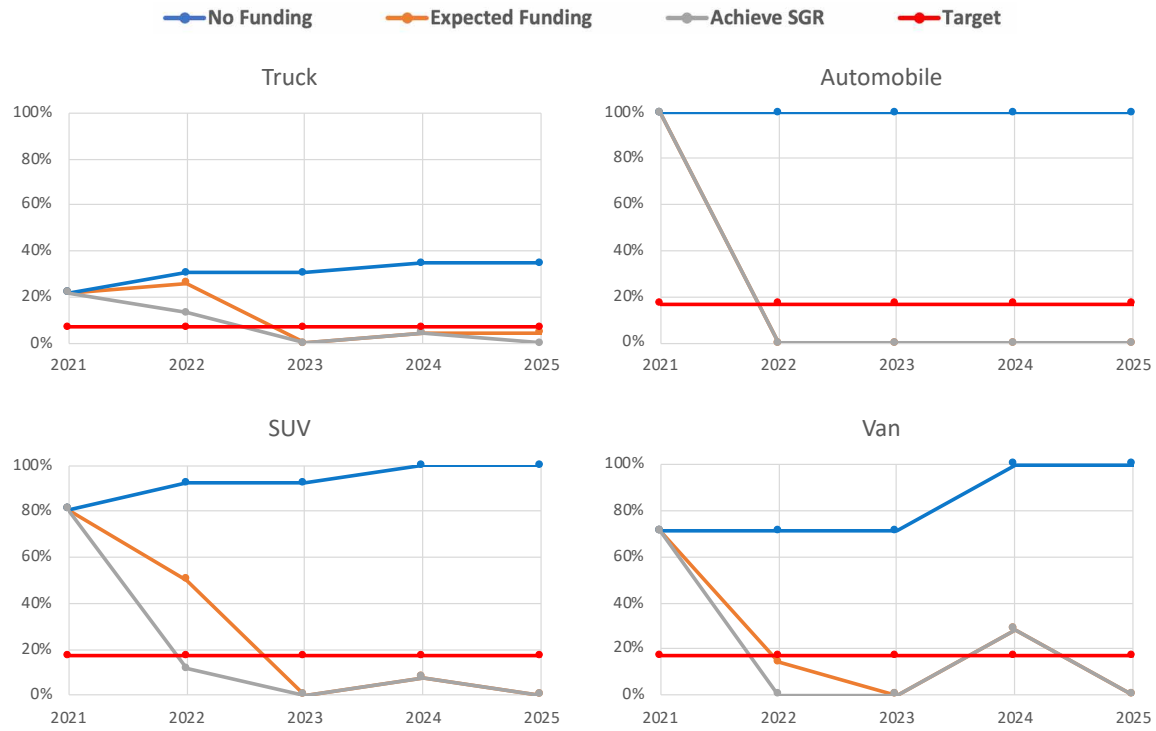


Figure 6-4. Predicted Performance for Tier II Equipment

Figure 6-5 shows predicted performance for Tier II facilities. The performance measure on the y-axis is the percent of facility components with a rating of 2-Marginal or 1-Poor on the 5-point TERM scale.

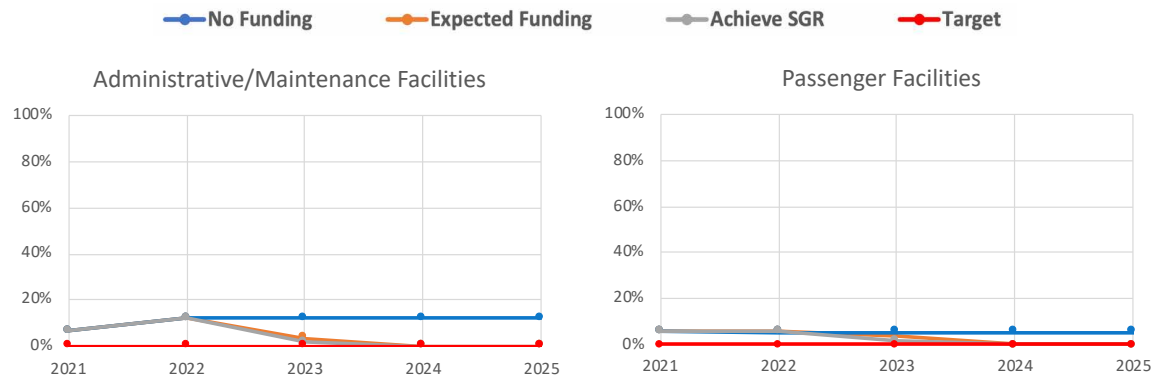


Figure 6-5. Predicted Performance for Tier II Facilities

Prioritized List of Investments

Tier II transit assets were modeled in TAPT using the Expected Funding scenario to generate a prioritized list of SGR needs. The full list of recommended investments was compared against the 2022 Capital Plan to validate the results. If an investment identified by TAPT was also included in the Capital Plan, it is assumed to be funded. SGR-related needs left unfunded at the end of 2025 are identified in a separate prioritized list.

Investing in Facilities

Facility projects represent the second largest need for Tier II operators behind revenue vehicles. In response to those needs, the Capital Plan includes facility funding for multiple Tier II agencies each year. Facility projects often include both SGR fixes and non-SGR improvements.

For example, GBTA recently completed work on a bus passenger facility. Thousands of bus riders pass through the GBTA Water Street bus station in downtown Bridgeport every day. The station has been in continuous use since its completion in 2007 with service to more than five million riders each year. In 2021, GBTA completed an SGR project to clean and repaint the extensive canopies at the facility and, at the same time, replaced bituminous bus bays with reinforced concrete pads and milled and replaced the travel lanes. These projects are part of an on-going process to maintain and modernize the facility. Today, GBTA is in the process of purchasing a state-of-the art passenger information system.

Another example is the HARTransit facility, undergoing its first major interior upgrade since 1998. The current project includes replacement of suspended ceilings; new paint, flooring and lighting throughout; updating of restroom and locker room facilities for drivers and mechanics; updating all lunchroom areas with new cabinetry and storage; the addition of a gender-neutral restroom; substantial reconfiguration of front-line supervision work spaces; repurposing a conference room into a workout/exercise room; and upgrade of the training room with improved air circulation and technology.

Table 6-1 summarizes the planned SGR-related funding for each Tier II provider based on the CTDOT Capital Plan. The table shows funding by agency and year and capital project.

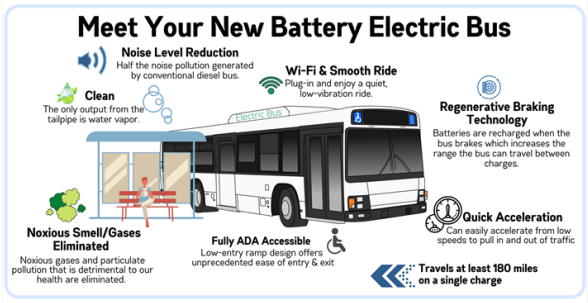
Note that the 2022 Capital Plan is based on cost and inflation expectations at the time of its publication. As prices have been increasing rapidly, the stated funding may be insufficient to meet the growing needs. CTDOT's capital

plan is constantly being adjusted to respond to economic changes.

Table 6-1. SGR Funding from Capital Plan

Provider	Description	Cost by Year ($000)			
		2022	2023	2024	2025
GBTA	Admin Capital/Misc Support	680	435	575	575
GBTA	Bridgeport Intermodal Center	200		200	200
GBTA	Replace Buses		13,750		
GBTA	Replace Paratransit Vehicles		605		
ETD	Admin Capital/Misc Support	70	56	400	400
ETD	Replace Small Buses	300			
GNHTD	Admin Capital/Misc Support				
GNHTD	Replace Paratransit Vehicles	1,800	1,500	1,800	1,750
HART	Admin Capital/Misc Support	200	200	200	200
HART	Facility Rehab/Improvements	1,500			
HART	Replace Fuel Storage Tanks			1,000	
HART	Pulse Point Rehab		800		
HART	Rehab Transit Buses		260		
HART	Replace Paratransit Vehicles	500		800	750
MAT	Admin Capital/Misc Support	300	300	300	300
MAT	Facility Improvements	500		500	500
MAT	Replace Transit Buses			1,875	
MTD	Admin Capital/Misc Support	400	400	400	400
MTD	Facility Improvements	75	75	120	100
MTD	Replace Paratransit Vehicles	250			375
NTD	Admin Capital/Misc Support	625	625	625	500
NTD	Facility Improvements			900	
NTD	Replace Buses	2,250			
NTD	Replace Paratransit Vehicles	1,100		1,250	1,000
SEAT	Admin Capital/Misc Support	725	450	300	300
SEAT	Replace Paratransit Vehicles			375	375
VTD	Admin Capital/Misc Support	400	400	400	400
VTD	Replace Small Buses		1,250		
WTD	Facility Improvements	4,000			
Other	Bus Replacements				6,250
Other	Match Requirements	7,000	7,000	7,000	7,000
Total		**23,375**	**28,606**	**19,520**	**21,875**

Investing in Electric Vehicles



Connecticut is leading the transition from diesel to battery electric buses, transforming the state's bus fleet to have zero tailpipe emissions. The Connecticut Electric Bus Initiative is a partnership between the CTDOT, Connecticut Department of Energy and Environmental Protection (CTDEEP) and CT*transit* to purchase and deploy electric buses across the state.

This initiative will help meet requirements laid out in Connecticut Public Act 22-25, signed by Governor Lamont on May 10, 2022, which contains support for electric vehicle infrastructure including a requirement mandating new buses be electric by 2024.

CTDOT had already starting transitioning towards electrification of the bus fleet prior to the 2022 law, starting with the deployment of two battery electric buses for GBTA in September 2020. The GBTA project also involved facility modernization needed to accommodate battery electric buses including an SGR project to update the electrical switchgear at the Bridgeport maintenance facility, the installation of the associated depot charging infrastructure and the construction of supplemental fire suppression systems.

In addition, both the Norwalk and the Estuary Transit District recently ran electric on-demand pilot projects within Connecticut.

CTDOT's capital plan includes funding for replacement of aging diesel buses with battery electric buses, as well as funding for related facility electrification upgrades.

Table 6-2 lists the additional SGR investments recommended by TAPT, but not funded as of 2025. The list of unfunded needs assumes that modeled work in the expected funding scenario, as shown in Figure 6-1, is completed

The table includes three columns:

- **Description**. The asset type and work.
- **Cost**. The cost of the investment.
- **Rank**. The priority of the investment. Investments are ranked based on the savings in agency and user costs resulting from the recommended investment relative to deferral.

Table 6-2. Prioritized List of Unfunded SGR Needs

Description	Cost ($000)	Priority
Cutaway Bus Replacement	685	1
Transit Bus Replacement	28,600	2
Service Vehicle Replacement	295	3

Chapter 7

Implementation and Monitoring

TAM is a series of processes intended to help preserve asset condition over the life of the asset at minimal cost. Practicing TAM means continuous improvement and TAM practices and processes need to be documented and reevaluated on an ongoing basis. As CTDOT continues implementing TAM and maturing its TAM practices and processes, the agency is always looking for opportunities for improvement. CTDOT has developed a set of implementation tasks to help improve TAM and update the PT-TAMP.

Overview

This chapter supplements the plan's discussion of current asset management practices in Connecticut with the identification of key implementation activities that will help to continue to improve our TAM practices. The TAMP is a living document that will evolve to reflect changing TAM practices and processes at CTDOT. This plan addresses needs for both Tier I and Tier II implementation, which CTDOT approaches in an integrated manner.

Federal Requirements

In 49 CFR 625.25, FTA requires that a Tier I provider must include the following items in a TAM plan:

- A provider's TAM plan implementation strategy
- A description of key TAM activities that a provider intends to engage in over the TAM plan horizon period
- A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM plan
- An outline of how a provider will monitor, update, and evaluate, as needed, its TAM plan and related business practices, to ensure the continuous improvement of its TAM practices

In 49 CFR 625.5, implementation strategy is defined as "a transit provider's approach to carrying out TAM practices, including establishing a schedule, accountabilities, tasks, dependencies, and roles and responsibilities."

Key asset management activities are defined as "a list of activities that a transit provider determines are critical to achieving its TAM goals."

TAM Plan Implementation Strategy

CTDOT implementation of TAM began before the FTA rule on TAM was finalized. CTDOT established a PT TAM Unit to coordinate TAM implementation and lead development of the PT-TAMP and Group-TAMP.

In anticipation of the final rule, CTDOT conducted a gap assessment of transit asset management practices in Connecticut. This initial effort had four objectives:

- Assess the current state of transit asset management practices at CTDOT
- Perform a transit asset management gap assessment
- Assess readiness to comply with FTA transit asset management requirements
- Develop implementation plan for addressing gaps

This assessment provided the foundation for the development of an initial TAM implementation plan, which included tasks to improve transit asset management practices.

In May 2019, the Bureau of Public Transportation's Asset Management Group, which reported to the Public Transportation Transit Manager, was organizationally reassigned to the Transportation Asset Management Group in the Bureau of Engineering and Construction.

As CTDOT has made progress developing the initial TAMPs in 2018, progress on implementation of initial identified key activities are discussed, as well as CTDOT's next steps for further implementation.

Key TAM Activities

This section presents a series of key TAM activities that CTDOT either needs or currently is doing to achieve asset management goals, improve TAM practices, and integrate TAM throughout the agency.

Improvement of Asset Inventory Management

CTDOT built the Transit Asset Management Database during the development of the TAMPs, as referenced in Chapter 3. Many of Connecticut transit service providers own, operate and maintain their transit assets; therefore, they are not registered in CORE-CT, the financial register. An integral step in accurate data collection and reporting is validating the Transit Asset Management Database with all transit service providers.

The current version of the Transit Asset Management Asset Database includes a web-based interface for data entry and approval. This version of the database was put into production in 2022 for use as single source of truth for all inventory management for non-CTDOT owned assets operated by Tier II operators. The database tracks condition for assets and has querying capabilities for more efficient annual reporting to FTA National Transit Database. This database supplements the State's Core-CT inventory.

Figure 7-1 below shows an example screen from the data review screen of the system.

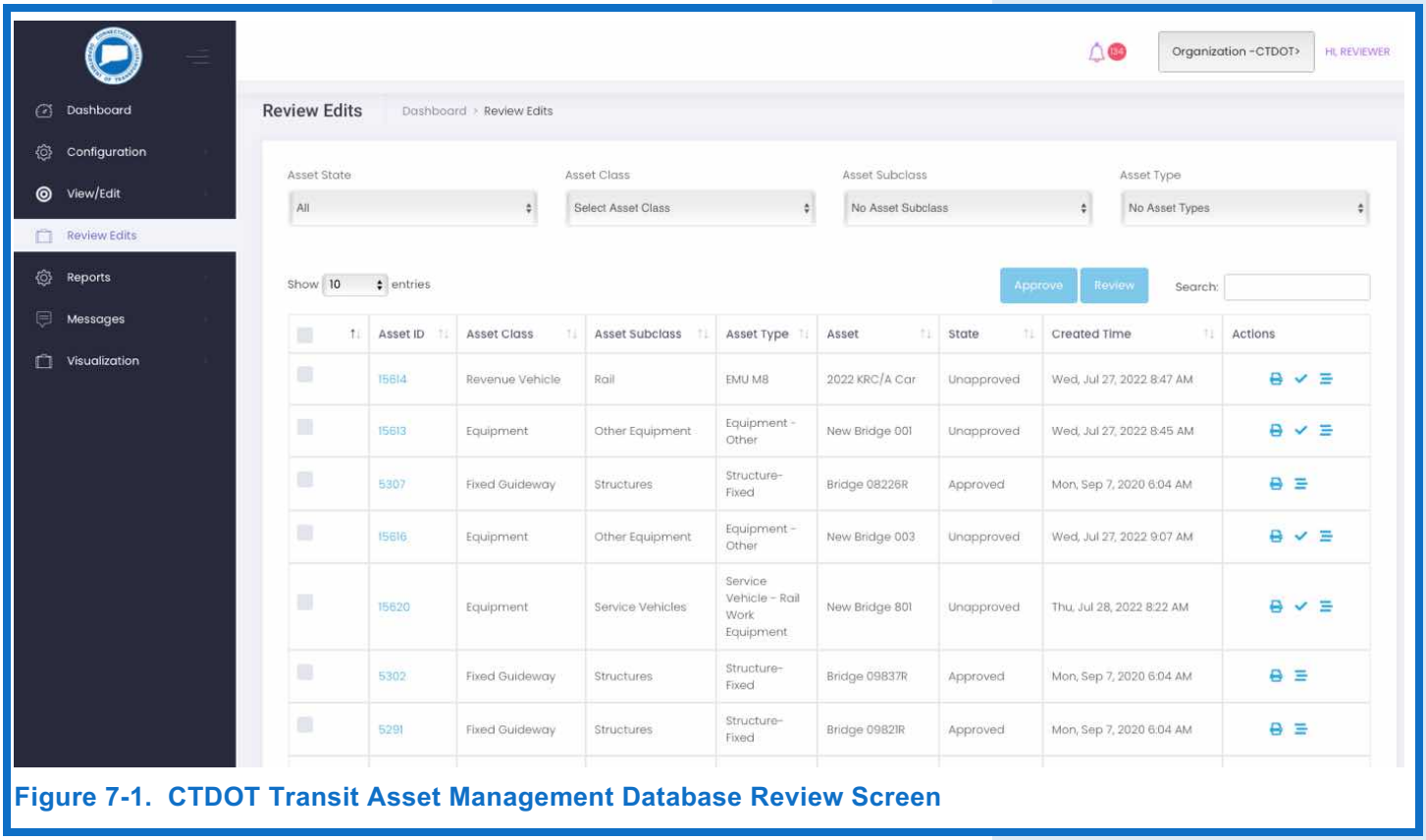


Figure 7-1. CTDOT Transit Asset Management Database Review Screen

Define and Implement Condition Assessment

As part of the development of the TAMP, CTDOT defined a condition assessment approach for rolling stock, equipment, infrastructure, and facilities, included in the Condition Assessment Guidance in Appendix B. In 2019, a statewide public transportation facilities inspection program was put into place to perform condition assessments to meet FTA reporting requirements on facilities for both Tier I and II operators. CTDOT will continue to collect, maintain, and update asset condition data for all assets on a cyclical basis. Part of this effort includes coordination with Amtrak and Metro-North for rail assets.

Also, for CTfastrak, CTDOT is collecting inventory and condition data using a similar approach to CTDOT highway. CTDOT collects pavement inventory and condition data using specially equipped Fugro Roadware Automatic Road Analyzer (ARAN) vans. The entire CTDOT-maintained

mainline is measured biannually. CTDOT performed an initial data collection run of CTfastrak guideway in March 2015, prior to the system opening. Regular data collection, data processing of the CTfastrak, along with integration with the Pavement Management System will continue.

Performance Measures Dashboard

CTDOT currently maintains an online performance measure dashboard that features proprietary measures linked to CTDOT's mission. FTA TAM performance measures have been included in the dashboard and will be continuously updated for the management of transit assets. Figure 7-2 below shows an example screen from the data review screen of the system.

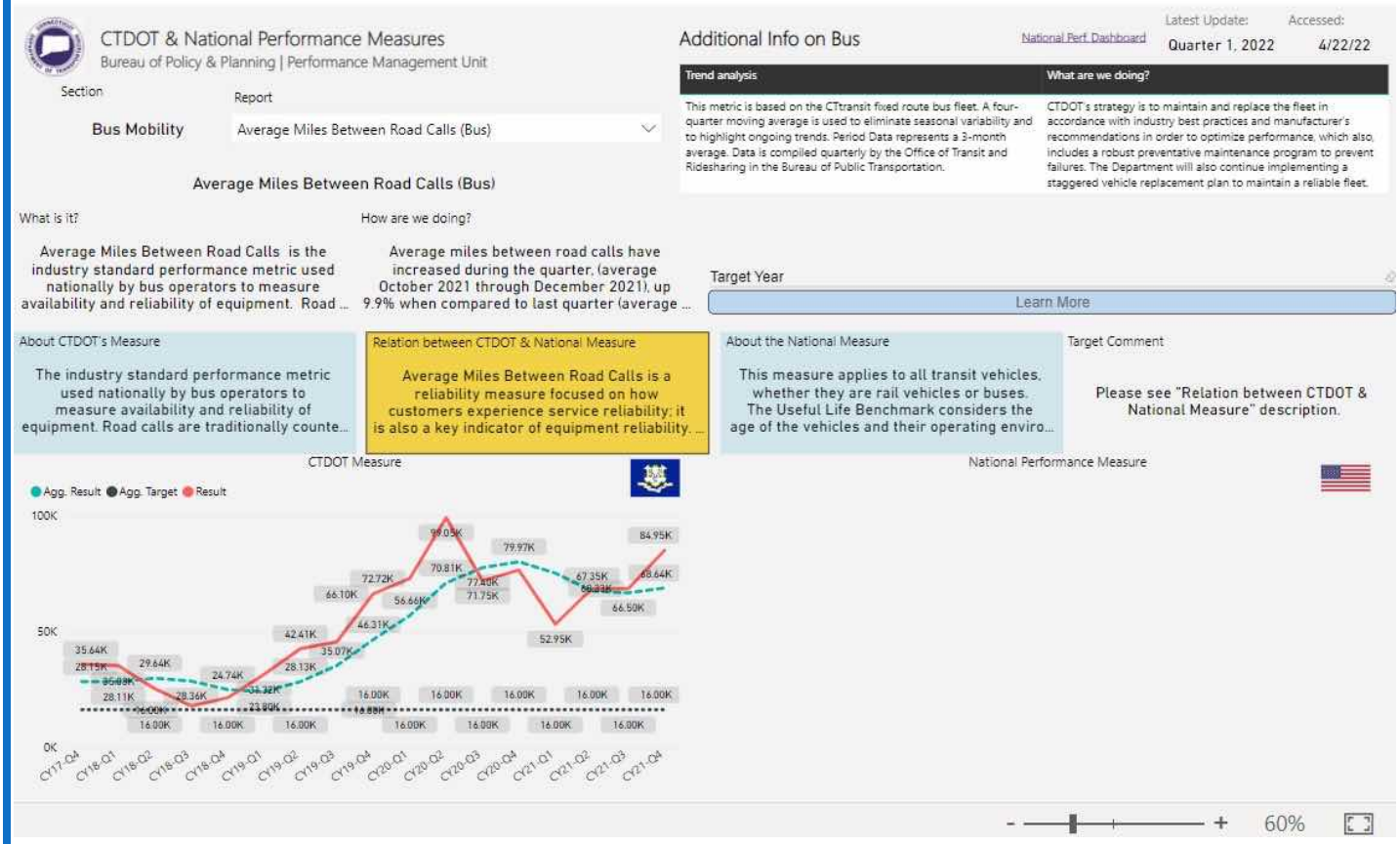


Figure 7-2. CTDOT Performance Dashboard Review Screen

Implement a Statewide Facilities Asset Management System

Using an asset or facilities management system to track day-to-day inspection and maintenance activities is consistent with best practices in asset management. CTDOT and other CT transit providers typically have systems for managing maintenance of their vehicles but tend to need systems for facility management.

CTDOT has begun the process of procuring a multimodal Facilities Management Solution (FMS) to manage CTDOT's entire asset class of buildings within a single system. A comprehensive FMS can help CTDOT record inventory, track assets, and manage the necessary asset management activities to keep all CTDOT's buildings operating in SGR. CTDOT can also use the system to assist in predicting capital programming expenditures in a transparent manner. The software should manage all asset management aspects of the building from maintaining the current inventory, tracking asset condition, performing detailed inspections, rating and ranking building assets by SGR, work order tracking that links back and updated asset condition, building deterioration modeling, and project prioritization and financial modeling multiple funding scenarios.

Once implemented, the vision for the system will be to manage and inspect CTDOT owned facility assets for both bus and rail, including other transit providers as well. This activity is also being considered to address management of other CTDOT asset classes in addition to transit facilities.

Improve Oversight of Maintenance Plans and Activities

CTDOT develops maintenance plans for new facilities, but appeared to need mechanisms for confirming these plans are followed. Further, many older facilities may not have maintenance plans altogether, or have outdated information on who is responsible for certain maintenance tasks. CTDOT also needed better oversight for other guideway assets along rail lines.

The Bureau of Public Transportation has taken initial steps to improve upon these gaps through various actions and activities. The Office of Rail and MNR worked together to update a rail passenger station matrix that outlines which entities are supposed to perform specific maintenance activities for New Haven Line Stations (snow removal, electrical maintenance, cleaning, etc.) The Office of Rail is also working with Amtrak to develop similar matrices for maintenance activities for Amtrak-occupied facilities within the New Haven Rail Yard.

In addition, the Bureau of Public Transportation has a Rail Regulatory Unit within the Office of Rail to address oversight of other rail guideway assets. Aside from primary responsibilities of improving general oversight of MOW activities by MNR, additional activities to date include developing pilot inspection programs for rail yard facilities and grade crossings. This Unit will continue to work closely with the TAM Group to ensure activities are coordinated and meet FTA compliance.

MNR is in the process of developing an enterprise asset management system for work order management along the rail lines it operates including New Haven Line. Coordination efforts have focused on ensuring CTDOT has access to this system to further improve its oversight responsibilities for the New Haven Line.

All of CT Transit divisions, including CTfastrak and all bus service providers in Connecticut, have extensive vehicle and facility maintenance plans in place, as required by the FTA. Procedures and specific maintenance inspections on vehicles and facilities are detailed in these plans. The TAM Group will continue to coordinate with all bus transit service providers in Connecticut as they explore and pilot different systems to ensure the oversight of these maintenance plans.

Improve Predictive Capability for Fixed Assets

As part of its initial TAMP development, CTDOT reviewed tools for predicting transit capital needs, including TAPT and

FTA's TERM Lite. For the 2018 TAMPs, CTDOT selected TAPT as its predictive modeling approach.

In preparation for the 2022 PT-TAMP CTDOT reviewed its modeling approach and assumptions. CTDOT decided to continue to use TAPT for predictive modeling for the 2022 TAMPs.

In the future, CTDOT will continue to refine the modeling approach for transit assets, particularly for fixed assets. Future modeling will require updated costs and more detailed and comprehensive data, as available. CTDOT will seek technical support for the training of TAPT as it works to integrate a defined prioritization process for the capital plan. Part of this effort includes coordinating with Amtrak and MNR for rail asset data.

The TAM Group works with its transit operators to ensure that the lifecycle needs/costs of the assets are being optimized and captured through a data driven process, to better understand when investments should be made. This iterative process that involves constant communication and development of data for analytical purposes as well as the procurement or development of mature asset management systems/software. Lifecycle strategies differ by each transit operator and by asset class:

Bus

- **Rolling Stock:** CT*transit* Hartford has a software called Asset Works which tracks data on vehicles down to the part. This system provides needed transparency and detail to accurately track lifecycle costs for all vehicles.
- **Guideway:** CTfastrak is a 9.4-mile bus-only guideway whose main component is a paved surface similar to a highway asset. The CTfastrak system is housed in CTDOT's pavement management system and roadway inventory network CTDOT's adapted Photolog technology where features of assets are identified and pavement condition tracked.
- **Facilities:** As mentioned earlier, the FMS system by CTDOT is a multimodal approach that includes CT*transit*. CT*transit*'s HNS operator is utilizing a pilot version of an FMS called FAMIS. They utilize FAMIS for

work orders to maintain all buildings at the Hartford, Hamden, and Stamford CT Transit Division facilities.

Rail

- **Rolling Stock:** MNR adopted a 35-year ULB for New Haven Line rolling stock, based on the commercial life of many car types while incorporating a Reliability Centered Maintenance (RCM) approach. This approach focuses on the ability to study failure rates and types in order to become more proactive in addressing maintenance issues and preserving the life of its rolling stock. Implementing a successful RCM approach can reduce dependency on costly capital repairs while also extending the life of an asset, saving CTDOT substantial financial obligations in the long term.
- **Guideway:** MNR performs day-to-day maintenance of CTDOT's portion of the New Haven Line. As part of MNR's new EAM system INFOR, they are currently implementing Bentley's Optram software package in order to better utilize data that is collected from the geometry cars that test for defects along the rail infrastructure. The ability to better use this data can be an invaluable tool to create more capital projects that are proactive in rail replacement and reduce reliance on emergency maintenance for rail defects.
- **Facilities:** As mentioned earlier, CTDOT will be procuring an FMS that will be able to collect better data on its rail facilities. Having more of this data readily available can provide better insight into operating costs and capital needs, to ensure facilities are constantly in SGR and operating efficiently and safely.

Improving STIP/ Capital Plan Development

An important product of asset management plan development is the prioritized list of SGR needs identified in chapter five. Ideally CTDOT and its partners will refer to this list of needs in developing future STIPs and capital plans. To help accomplish this, the TAM Group will work with Capital

Services to improve the connection between the STIP and the Capital Program for Transit Assets.

Maintain and Update Transit Asset Management Plan

FTA requires that a transit provider must update its TAM plan every four years. Additionally, a provider should amend its TAM plan when there is a significant change to inventory, condition, or investment prioritization. CTDOT will work to continue updating the TAMPs on a four-year cycle and to revise the plan to be consistent with any significant changes. Updating the TAMPs will involve updating the inventory data, performing new condition assessments, modeling new investment scenarios, and generating a new list of prioritized SGR investments.

Information Sharing

CTDOT facilitates exchange of information on asset management practices between transit providers in Connecticut. Participants should include CTDOT staff, as well as transit providers under contract to CTDOT, and the transit districts.

The newly created Transit Asset Management Database is crucial not only for developing inventory, but creating a system where data could be authenticated, maintained, and shared amongst various stakeholders who depend on the data collected within this system.

In addition, a long-term vision will be focused on how to integrate the Transit Asset Management database into CTDOT's existing and future data sharing structure. CTDOT's Transportation Enterprise Database (TED) was put into place as a means of establishing a universal source of data by linking numerous other databases into a universal system

TAM Group will develop a program of periodic peer exchanges and/or facilitated workshops to communicate current status of CTDOT transit asset management

activities and facilitate exchange of information on asset management approaches/lessons learned.

Linking TAM Performance Targets to Statewide Planning.

CTDOT has established roles and responsibilities through its cooperative agreement with Metropolitan Planning Organization's (MPO) for the establishment of statewide performance targets. CTDOT and transit operators review and update statewide performance targets annually, and reports progress towards achieving statewide performance targets to the NTD. Information is available to the MPO's for use in their updates to the Long Range Transportation Plans, and Transportation Improvement Programs. CTDOT will continue to notify and share updated TAM Plans with the MPO's, every four years.

Improving Data Governance

Recently, CTDOT prepared a Transit Asset Management Business Requirements document to assess governance of data related to transit TAMP development and NTD reporting, define requirements for public transportation business processes related to these areas, and develop recommendations regarding the use of asset data to support SGR analysis. This document also details functional requirements for any new or improved systems for managing transit asset data. Information from this document informed the development of the web interface for the Transit Asset Management Database described previously. This system provides asset and condition tracking for asset management, and supports the operational needs for the Transit Office, including better oversight of transfer and disposal revenue vehicles.

Support Tier II Asset Management Efforts

Comprehensive implementation of an asset management approach addresses how an asset is managed over its entire lifecycle, from construction or purchase through to its retirement or replacement. Consequently, putting best

practices in asset management into place in an agency can impact a number of business functions. Connecticut's transit providers are committed to using an asset management approach to help improve the State of Good Repair of Connecticut's physical transit assets, and make the best use of scarce resources. Over time application of asset management concepts may impact areas such as how maintenance decisions are made, what staff transit agencies need to meet their mission, and the data and systems they use.

The TAM Group will help support Tier II transit agency efforts to implement asset management concepts more broadly in their agencies through the communication and outreach activities described previously in this section. To evaluate progress in this area CTDOT will assess whether the outreach activities are conducted as described in this document, and the level of participation of the agencies in the various outreach activities. This evaluation will help inform the set of asset management-related activities that are needed in future updates of this plan.

TAM Resources

This section describes the TAM resources needed to develop and carry out the TAMPs. While CTDOT is integrating TAM throughout the agency, a TAM Implementation Committee will be created consisting of representatives from transit providers and key CTDOT staff to support future TAM implementation activities. CTDOT also convened working groups consisting of Tier I and Tier II stakeholders to help update the TAMPs.

CTDOT is also using ongoing consultant support for TAM implementation.

Monitoring and Evaluations

CTDOT will monitor, update, and evaluate the TAMPs as an ongoing activity.

The TAM Group will lead the implementation activities, update the plan, and periodically convene workshops to interface with other transit providers. This work includes two of the TAM implementation activities above: “Maintain and Update TAM Plan” and “Information Sharing”.

In addition, the TAM Group will lead a series of further monitoring and evaluation activities in the following key areas:

- Improving Data Governance;
- Linking TAM Performance Targets to Statewide Planning
- Implementing use of asset management targets.
- Updating the asset management needs analysis; and
- Support Tier II asset management implementation.

The following paragraphs discuss specific activities in each of these areas.

Updating the Asset Management Needs Analysis. Although FTA does not require annual updates of this plan, annual updates to the data and assessment of SGR needs to support performance reporting requirements and the related business processes described above. The TAM Group will update the SGR needs analysis on an annual basis to support these requirements, incorporating the improvements to asset data and the analysis of SGR needs described above. To evaluate progress in this area CTDOT will assess whether the needs analysis is, indeed, updated on an annual basis incorporating updates to asset data and supporting systems.

Implementing Use of Asset Management Targets. Moving forward the measures and targets established for asset management should inform investment decisions, and in particular the identification of and selection of capital projects. The TAM Group will work with CTDOT’s Capital Services to ensure that the capital program is structured to achieve these targets once set. To evaluate progress in this area CTDOT will assess the degree to which the targets established in the annual target-setting process are met.

Appendix A. FTA Section 5310 Subrecipients

5310 Legal Owner	Year	Number of Vehicles
Ability Beyond Disability, Inc.	2012	2
Ability Beyond Disability, Inc.	2014	1
Ability Beyond Disability, Inc.	2016	1
Ability Beyond Disability, Inc.	2017	2
Ability Beyond Disability, Inc.	2017	1
Ability Beyond Disability, Inc.	2019	1
Town of Ashford	2017	1
Town of Woodbridge	2016	1
Town of Woodbridge	2021	1
Town of Wolcott	2006	1
Town of Wolcott	2011	1
Town of Wolcott	2013	1
Town of Wolcott	2019	1
Town of Windsor Locks	2010	1
Town of Windsor Locks	2016	1
Town of Windsor Locks	2021	1
Town of Windsor	2013	1
Town of Windsor	2016	1
Town of Windsor	2016	1
Town of Windsor	2019	1
Town of Windsor	2019	1
Town of Windsor	2021	1
Town of Watertown	2008	1
Town of Watertown	2014	1
Town of Watertown	2019	1
Town of Waterford	2009	1
Town of Waterford	2013	1
Town of Waterford	2017	1
Town of Trumbull	2012	1
Town of Trumbull	2013	1
Town of Trumbull	2017	1
Town of Trumbull	2019	1
Town of Suffield	2009	1
Town of Suffield	2011	1
Town of Suffield	2012	1
Town of Suffield	2019	1
Town of Suffield	2021	1
Town of Stratford Senior Services	2007	1
Town of Stratford Senior Services	2009	1
Town of Stratford Senior Services	2021	1
Town of Stratford Senior Services	2017	1
Town of Stafford	2016	1
Town of Sprague	2013	1
Town of Sprague	2017	1

Town of Southbury	2016	1
Town of Southbury	2017	1
Town of South Windsor	2009	1
Town of South Windsor	2021	1
Town of South Windsor	2017	1
Town of South Windsor	2019	1
Town of South Windsor	2021	1
Town of Somers	2016	1
Town of Somers	2019	1
Town of Simsbury	2014	1
Town of Simsbury	2016	1
Town of Sherman	2017	1
Town of Roxbury	2105	1
Town of Rocky Hill	2008	1
Town of Rocky Hill	2009	1
Town of Rocky Hill	2013	1
Town of Rocky Hill	2018	1
Town of Rocky Hill	2019	1
Town of Prospect	2009	1
Town of Prospect	2016	1
Town of Prospect	2018	1
Town of Plainville	2011	1
Town of Plainville	2017	1
Town of Plainville	2021	1
Town of Orange	2016	1
Town of Orange	2017	1
Town of Orange	2019	1
Town of New Milford	2010	1
Town of New Milford	2014	1
Town of New Milford	2019	1
Town of Montville	2013	1
Town of Middlebury	2014	1
Town of Middlebury	2021	1
Town of Marlborough	2012	1
Town of Marlborough	2019	1
Town of Mansfield	2012	1
Town of Manchester	2012	1
Town of Manchester	2014	1
Town of Manchester	2019	1
Town of Litchfield	2015	1
Town of Ledyard	2013	1
Town of Hebron	2016	1
Town of Hebron	2017	1
Town of Groton	2017	1
Town of Groton	2019	1

Town of Griswold	2016	1
Town of Goshen	2017	1
Town of Glastonbury	2016	1
Town of Glastonbury	2019	1
Town of Glastonbury	2019	1
Town of Farmington	2013	1
Town of Farmington	2018	1
Town of Farmington	2019	1
Town of Enfield	2009	1
Town of Enfield	2010	1
Town of Enfield	2011	1
Town of Enfield	2012	1
Town of Enfield	2013	1
Town of Enfield	2016	2
Town of Enfield	2019	2
Town of East Windsor	2007	1
Town of East Windsor	2011	1
Town of East Windsor	2012	1
Town of East Windsor	2019	1
Town of Cromwell	2012	1
Town of Cromwell	2018	1
Town of Cromwell	2019	1
Town of Colchester	2010	1
Town of Colchester	2012	1
Town of Colchester	2017	1
Town of Colchester	2019	1
Town of Cheshire	2010	1
Town of Cheshire	2016	2
Town of Cheshire	2017	1
Town of Cheshire	2018	1
Town of Canton	2016	1
Town of Beacon Falls	2015	1
Town of Avon	2013	1
City of Torrington - Sullivan Senior Center	2016	1
City of Torrington - Sullivan Senior Center	2019	1
City of Torrington - Sullivan Senior Center	2021	1
Sunrise Northeast, Inc.	2017	1
Transportation Assoc. of Greenwich	2009	1
Transportation Assoc. of Greenwich	2013	1
Transportation Assoc. of Greenwich	2014	1
Transportation Assoc. of Greenwich	2016	1
Transportation Assoc. of Greenwich	2021	1
The Wheels Program of New Milford	2016	1
The Arc of Litchfield County, Inc	2013	1
The Arc of Litchfield County, Inc	2015	1

The Arc of Litchfield County, Inc	2017	1
The Arc of Litchfield County, Inc	2021	1
Sphere, Inc	2012	1
Norwalk Senior Center	2013	1
Norwalk Senior Center	2018	1
Norwalk Senior Center	2019	1
Hockanum Valley Community Council	2009	1
Hockanum Valley Community Council	2009	1
Hockanum Valley Community Council	2012	1
Hockanum Valley Community Council	2013	1
Hockanum Valley Community Council	2013	1
Hockanum Valley Community Council	2016	1
Hockanum Valley Community Council	2018	1
Hockanum Valley Community Council	2019	1
Geer Nursing & Rehabilitation Center	2012	1
Geer Nursing & Rehabilitation Center	2019	1

Appendix B. Approval by Accountable Executives

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Douglas C. Holcomb, confirm that I am the Accountable Executive for Greater Bridgeport Transit Authority.

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/21/22

General Manager/Chief Executive Officer

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Joseph Comerford confirm that I am the Accountable
Name of Accountable Executive

Executive for Estuary Transit District.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 09/23/2022
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Mario Marrero confirm that I am the Accountable
Name of Accountable Executive

Executive for Greater New Haven Transit District.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 09/21/2022
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, RICHARD A. SCHREINER confirm that I am the Accountable
Name of Accountable Executive

Executive for HOUSATONIC AREA REGIONAL TRANSIT
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/14/2022
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Henry Jadach confirm that I am the Accountable
Name of Accountable Executive

Executive for Milford Transit District
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/19/22
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, John Filchak confirm that I am the Accountable
Name of Accountable Executive

Executive for Northeastern Connecticut Transit District.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/22/2022
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Brian Kalosky confirm that I am the Accountable
Name of Accountable Executive

Executive for Northwestern CT Transit District
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/26/22
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Matt Pentz confirm that I am the Accountable
Name of Accountable Executive

Executive for Norwalk Transit District.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9/28/22
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Michael J. Carroll confirm that I am the Accountable
Name of Accountable Executive

Executive for Southeast Area Transit District.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: September 22, 2022
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Mark Pandolfi, confirm that I am the Accountable Executive for the Valley Transit District

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: September 21, 2022

Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Linda Hapeman confirm that I am the Accountable
Name of Accountable Executive

Executive for Windham Region Transit District
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: Linda Hapeman Date: 9/23/22
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Cynthia van Zelm confirm that I am the Accountable
Name of Accountable Executive

Executive Director for the Mansfield Downtown Partnership on behalf of the Town of Mansfield

I certify that the Town of Mansfield is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: Cynthia van Zelm Date: 9/20/22
Executive Director

Public Transportation
Transit Asset Management Group Plan
2022-2025

I, Keith Gove confirm that I am the Accountable
Name of Accountable Executive

Executive for Mashantucket Pequot Tribal Nation.
Name of Transit Agency

I certify that my transit agency is in compliance with 49 CFR, Section 625.27 of the Transit Asset Management Rule, by participating in above noted Transit Asset Management Group Plan (Group Plan), sponsored by Connecticut Department of Transportation. I hereby approve the updates to the Group Plan and will continue implementing the TAM plan at my property.

Signed: _____ Date: 9-21-2022

Executive Director

Appendix C. Asset Fact Sheets

Connecticut Tier II Transit Asset Management Plan

Bus Rolling Stock

Description

- In non-CTtransit service areas, local transit districts provide bus transit services under the direction of local Boards of Directors representing the member towns.
- CTDOT supports about 90% of the deficit funding in the urban systems, and the state and federal government provide 83% of the deficit funding in the rural systems.
- CTDOT has a capital interest in bus rolling stock for twelve transit districts.
- Transit district bus rolling stock inventory includes three vehicle types: transit bus, cutaway, and minivan.

Performance Measures

The percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark

- Useful life benchmark (ULB) defines an asset's economic useful life, specified in terms of age, mileage and/or other factors. An agency can use FTA's default ULB values or set its own values. CTDOT has worked with its transit service provider partners to define custom values.
- A revenue vehicle that has not reached or exceeded its ULB is considered to have met the performance metric.

Inventory and Condition

Transit Bus

A bus with front and center doors, low floor, normally with a rear-mounted engine, and low-back seating. This vehicle can usually hold about 42 ambulatory passengers when two wheelchair tiedowns are provided.

172 Vehicles

12 Years ULB

95% Below ULB

Cutaway Bus

A vehicle that consists of a bus body that is mounted on the chassis of a van or light-duty truck. The original van or light-duty truck chassis may be reinforced or extended. Cutaways typically seat 15 or more passengers and may accommodate some standing passengers.

282 Vehicles

5 Years ULB

43% Below ULB

Minivan

A light duty vehicle having a typical seating capacity of up to seven passengers plus a driver. A minivan is smaller, lower and more streamlined than a full-sized van, but it is typically taller and has a higher floor than a passenger car. Minivans normally cannot accommodate standing passengers.

7 Vehicles

5 Years ULB

0% Below ULB

Total

461 Vehicles

62% Within ULB

Based on CTDOT data as of June, 2022

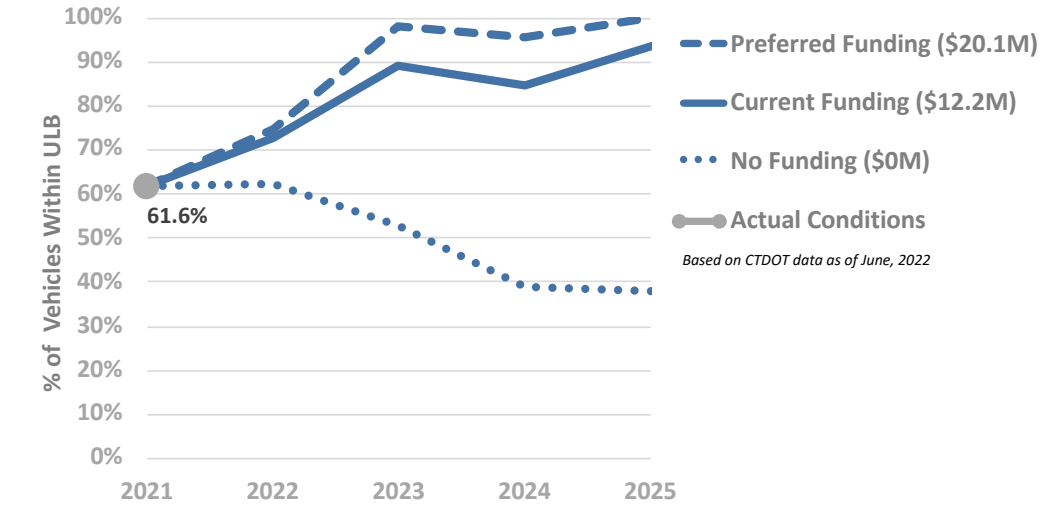
**The Performance measures herein are for FTA reporting purposes only. Due to the variability of mechanical reliability and operating environment, the age based metric prescribed by FTA does not fully reflect SGR needs.*

Connecticut Tier II Transit Asset Management Plan

Bus Rolling Stock

Bus Rolling Stock Performance Projections

Percent of Vehicles Within ULB



CTDOT anticipates $84 million of SOGR needs from 2022-2025 for Tier II Bus Rolling Stock. This includes an initial backlog in 2022 of $37 million in SOGR needs.

Current funding for SOGR activities was calculated based on CTDOT's Capital Plan with the help of CTDOT's Capital Services Unit. Connecticut's Capital Plan is a document that lists all projects expected to be federally-funded over a five-year period.

Based on projections made using CTDOT's prioritization tool given current funding, to make progress on its SOGR needs Connecticut should invest approximately $49 million in Tier II revenue vehicles over the four-year analysis period.

*Years referenced in these charts are by State of Connecticut Fiscal Year which runs from July 1st to June 30th.

Current Performance and Targets

A group TAM plan sponsor must set unified, one-year performance targets using the performance measures established by FTA for the four capital asset categories required for a TAM plan, as applicable. These targets must be updated and submitted to the NTD annually. These targets must be coordinated with the Tier II transit providers.

Performance and Targets for Tier II Bus Rolling Stock

	% Vehicles Within ULB	% Vehicles Met or Exceeded ULB	
Asset Class	**Current Performance**	**Current Performance**	**Performance Target**
Transit Bus	**95%**	**5%**	**14%**
Cutaway	**43%**	**57%**	**17%**
Minivan	**0%**	**100%**	**17%**

Transit Funding

CTDOT creates a funding pool from which capital projects in regions around the state are funded. The disbursement of these funds based on annual needs is approved by the MPOs in the STIP. Sub-area split agreements that reflect the annual disbursement of funds by region are created by CTDOT and executed by the transit operators from each region. This program allows local transit operators to fund major projects for which they may otherwise have never accumulated adequate funds.

Analytical Approach

CTDOT uses the Transit Asset Prioritization Tool (TAPT) to support its analytical approach for Connecticut transit districts. TAPT is a spreadsheet tool for predicting transit asset conditions and SGR needs.

The tool has a series of models for different asset types that recommend when to rehabilitate or replace an asset, and the conditions and performance predicted for the asset over time. Also, the tool supports prediction of the overall performance resulting for a specified funding scenario, and recommends a prioritized list of projects to fund given a budget constraint.

Connecticut Tier II Transit Asset Management Plan

Service Vehicles

Description

- Service vehicles are defined by FTA as equipment used primarily to support maintenance and repair work for public transportation.
- Tier II service vehicles support bus transit.
- Tier II service providers own service vehicles that are organized into four types. Rubber tire vehicles (trucks), automobiles, SUVs, and vans, which can be used as staff vehicles.

Performance Measures

The percentage of service vehicles within a particular asset class that have either met or exceeded their useful life benchmark

- Useful life benchmark (ULB) defines an asset's economic useful life, specified in terms of age, mileage and/or other factors. An agency can use FTA's default ULB values or set its own values. CTDOT has worked with its transit service provider partners to define custom values.
- A service vehicle that has not reached or exceeded its ULB is considered to have met the performance metric.

Inventory and Condition

Rubber Tire Vehicles (Trucks)

Any motor vehicle designed to transport cargo.

23 Vehicles

14 Years ULB

78% Below ULB

Automobiles

Passenger cars, up to and including station wagons in size. Excludes minivans and anything larger.

2 Vehicles

5 Years ULB

0% Below ULB

Sport Utility Vehicle

A high-performance four-wheel drive car built on a truck chassis. It is a passenger vehicle which combines the towing capacity of a pickup truck with the passenger-carrying space of a minivan or station wagon.

26 Vehicles

5 Years ULB

19% Below ULB

Van

An enclosed vehicle having a typical seating capacity of 8 to 18 passengers and a driver. A van is typically taller and with a higher floor than a passenger car, such as a hatchback or station wagon.

7 Vehicles

5 Years ULB

29% Below ULB

Total

58 Vehicles

43% Within ULB

Based on CTDOT data as of June, 2022

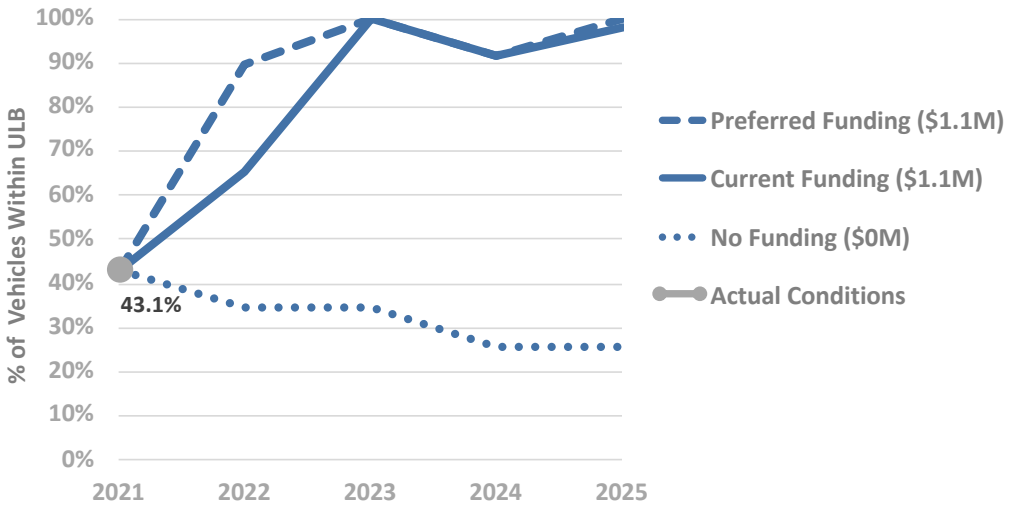
**The Performance measures herein are for FTA reporting purposes only. Due to the variability of mechanical reliability and operating environment, the age based metric prescribed by FTA does not fully reflect SGR needs.*

Connecticut Tier II Transit Asset Management Plan

Service Vehicles

Service Vehicles Performance Projections

Percent of Service Vehicles Within ULB



CTDOT anticipates $5 million of SOGR needs from 2022-2025 for Tier II Service Vehicles. Much of the service vehicles are part of the initial backlog in 2022, totaling around $4 million.

Current funding for SOGR activities was calculated based on CTDOT's Capital Plan with the help of CTDOT's Capital Services Unit.

Based on projections made using CTDOT's prioritization tool given current funding, to make progress on its SOGR needs Connecticut should invest approximately $4.3 million in Tier II service vehicles over the four-year horizon from 2022-2025.

Years referenced in these charts are by State of Connecticut Fiscal Year which runs from July 1st to June 30th.
Based on CTDOT data as of June, 2022

Current Performance and Targets

Transit providers must set one-year performance targets using the performance measures established by FTA for the four capital asset categories required for a TAM plan, as applicable. These targets must be updated and submitted to the NTD annually.

Performance and Targets for Tier II Service Vehicles

	% Vehicles Within ULB	% Vehicles Met or Exceeded ULB	
Asset Class	Current Performance	Current Performance	Performance Target
Rubber Tire Vehicle (Truck)	78%	22%	7%
Automobile	0%	100%	17%
Sport Utility Vehicle	19%	81%	17%
Van	29%	71%	17%

Transit Funding

CTDOT creates a funding pool from which capital projects in regions around the state are funded. The disbursement of these funds based on annual needs is approved by the MPOs in the STIP. Sub-area split agreements that reflect the annual disbursement of funds by region are created by CTDOT and executed by the transit operators from each region. This program allows local transit operators to fund major projects for which they may otherwise have never accumulated adequate funds.

Analytical Approach

CTDOT uses the Transit Asset Prioritization Tool (TAPT) to support its analytical approach. TAPT is a spreadsheet tool for predicting transit asset conditions and SGR needs.

The tool has a series of models for different asset types that recommend when to rehabilitate or replace an asset, and the conditions and performance predicted for the asset over time. Also, the tool supports prediction of the overall performance resulting for a specified funding scenario, and recommends a prioritized list of projects to fund given a budget constraint.

Connecticut Tier II Transit Asset Management Plan

Bus Facilities

Description

- Tier II transit providers in Connecticut own 10 administrative or maintenance facilities and five passenger facilities.
- The following providers own facilities: GBTA, HART, MAT, MlfdTD, GNHTD, NWLKTD, SEAT, WRTD, VTD. The Nash-Zimmer Transportation Center owned by the Town of Mansfield is also included.
- Over half of the facilities have recent formal condition assessments, while condition data for the other facilities is based on engineering judgement.

Performance Measures

The percentage of facilities within a particular asset class rated below condition 3 on the FTA Transit Economic Requirements Model (TERM) scale.

- Major facility components are inspected and rated on a 1 to 5 condition scale. The component condition ratings are averaged using weight factors and replacement cost to calculate the overall condition of a facility.
- For some components, a visual inspection may be insufficient for establishing conditions. In these cases, an age-based approach is used to estimate condition using useful life.
- A facility that has a condition rating of 3 or greater has met the performance metric.

Inventory and Condition

Administrative/Maintenance

Administrative facilities are typically offices that house management and supporting activities for overall transit operations such as accounting, finance, engineering, legal, safety, security, customer services, scheduling, and planning. They also include facilities for customer information or ticket sales, but that are not part of any passenger station. Maintenance facilities are those where routine maintenance and repairs or heavy maintenance or unit rebuilds are conducted.

10 Facilities

94% components rated 3 or above

Passenger/Parking

Passenger facilities are significant structures on a separate ROW. Examples include

- All motorbus, rapid bus, commuter bus, and trolley bus passenger facilities in a separate ROW that have an enclosed structure (building) for passengers for items such as ticketing, information, restrooms, and concessions
- All transportation, transit or transfer centers, and transit malls if they have an enclosed structure (building) for passengers for items such as ticketing, information, restrooms, concessions, and telephones

5 Facilities

94% components rated 3 or above

Total

15 Facilities

94% components rated 3 or above

Based on CTDOT data as of June, 2022

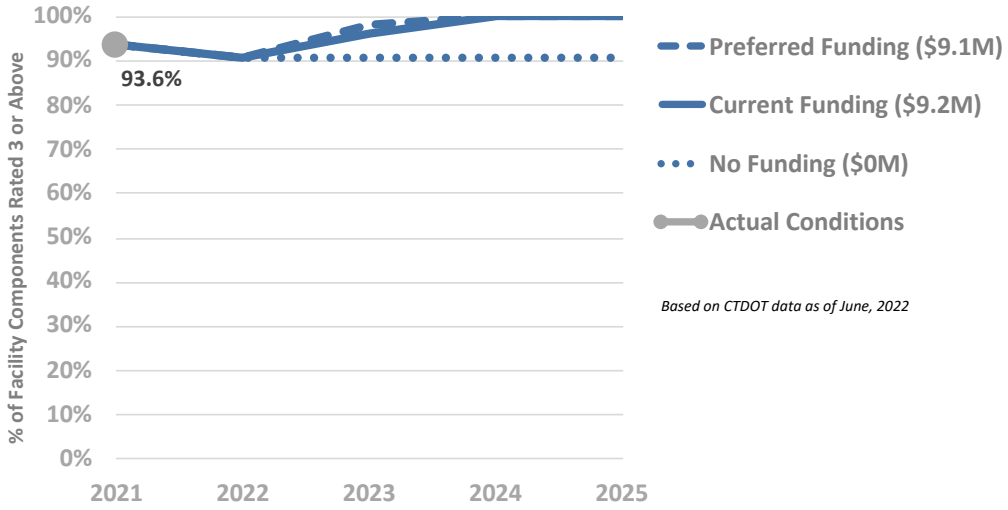
**Performance measure herein is required for FTA reporting purposes only. Condition Ratings are used to determine overall SGR status either through engineering judgement or formal condition assessments, which may not reflect SGR needs in its entirety.*

Connecticut Tier II Transit Asset Management Plan

Bus Facilities

Bus Facilities Performance Projections

Percent of Bus Facility Components Rated 3 or Above on FTA TERM Scale



Based on CTDOT data as of June, 2022

CTDOT anticipates about $39 million of SOGR needs from 2022-2025 for Tier II Bus Facilities.

Current funding for SOGR activities was calculated based on CTDOT's Capital Plan with the help of CTDOT's Capital Services Unit. Connecticut's Capital Plan is a document that lists all projects expected to be federally-funded over a five-year period.

Based on projections made using CTDOT's prioritization tool, the current funding level will allow Tier II facilities to achieve the desired SOGR.

*Years referenced in these charts are by State of Connecticut Fiscal Year which runs from July 1st to June 30th.

Current Performance and Targets

Transit providers must set one-year performance targets using the performance measures established by FTA for the four capital asset categories required for a TAM plan, as applicable. These targets must be updated and submitted to the NTD annually.

Performance and Targets for Tier II Bus Facilities

	% Components Rated 3 or Above	% Facilities Rated 3 or Above	% Facilities Rated Below Condition 3	
Asset Class	Current Performance	Current Performance	Current Performance	Performance Target
Administrative/ Maintenance	94%	100%	0%	0%
Passenger	94%	100%	0%	0%

Transit Funding

CTDOT creates a funding pool from which capital projects in regions around the state are funded. The disbursement of these funds based on annual needs is approved by the MPOs in the STIP. Sub-area split agreements that reflect the annual disbursement of funds by region are created by CTDOT and executed by the transit operators from each region. This program allows local transit operators to fund major projects for which they may otherwise have never accumulated adequate funds.

Analytical Approach

CTDOT uses the Transit Asset Prioritization Tool (TAPT) to support its analytical approach. TAPT is a spreadsheet tool for predicting transit asset conditions and SGR needs.

The tool has a series of models for different asset types that recommend when to rehabilitate or replace an asset, and the conditions and performance predicted for the asset over time. Also, the tool supports prediction of the overall performance resulting for a specified funding scenario, and recommends a prioritized list of projects to fund given a budget constraint.

Appendix D. Condition Assessment Guidance

Condition Assessment Guidance

Connecticut Department of Transportation

May 15, 2018

Spy Pond Partners, LLC
with CDM Smith Inc.

Table of Contents

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1.0 Introduction

1.1 Background and Purpose

The mission of the Bureau of Public Transportation at Connecticut Department of Transportation (CTDOT) is "to develop, maintain, and operate a system that provides for the safe, efficient and sustainable movement of people and goods." In pursuit of that mission, CTDOT has three transit objectives:

- Maintain existing systems at a state of good repair and enhance system safety and security
- Improve efficiency and effectiveness of transit service delivery
- Expand services to capture a greater share of existing markets and address specific new markets.

CTDOT faces an unusual challenge because of the transit service delivery model in Connecticut. Unlike many other state DOTs, CTDOT owns transit systems including bus operations throughout the state as well as the Shore Line East and New Haven Line commuter rail service.

Fifty percent of CTDOT's annual operating budget is dedicated to Public Transportation statewide operations. CTDOT has direct financial responsibility for millions of dollars of transit assets in Connecticut, but contracts out the operation of transit service to private companies. To meet the requirements for developing a transit asset management plan, established in the final rule on Transit Asset Management by the Federal Transit Administration (FTA), CTDOT is obligated to collect data, manage, and report on transit assets throughout the state.

As part of the rule on transit asset management, providers must develop and implement transit asset management (TAM) plans. Transit providers may be required to either develop their own TAM plan or participate in a group TAM plan depending on whether they are Tier I or Tier II. The FTA rule on Transit Asset Management defines Tier I and Tier II providers:

> *Tier I provider* means a recipient that owns, operates, or manages either (1) one hundred and one (101) or more vehicles in revenue service during peak regular service across all fixed route modes or in any one non-fixed route mode, or (2) rail transit.
>
> *Tier II provider* means a recipient that owns, operates, or manages (1) one hundred (100) or fewer vehicles in revenue service during peak regular service across all non-rail fixed route modes or in any one non-fixed route mode, (2) a subrecipient under the 5311 Rural Area Formula Program, (3) or any American Indian tribe.

States must develop a group TAM plan for Tier II transit providers, while Tier I providers must develop their own TAM plans. Tier II providers may also choose to forgo the group plan and develop individual plans.

A TAM plan needs to include TAM and SGR policy, TAM plan implementation strategy, an asset inventory, condition assessments, a description of systems used to predict capital needs, a project-based prioritization of investments, a description of key TAM activities, a list of TAM resources, and an outline for updating the plan and TAM practices.

The condition assessment must be performed at a level of detail sufficient to support capital planning. Also, ideally, the condition assessment should support calculation of the SGR performance measures FTA has defined for four capital assets categories: equipment (non-revenue vehicles), rolling stock (revenue vehicles), infrastructure (rail fixed-guideway, track, signals, and systems), and facilities. This document establishes an approach for calculating asset condition for each of the four asset categories.

1.2 Document Organization

This guidebook is organized into five main sections:

- **Section 1** describes the background of the project and the organization of this document.
- **Section 2** describes the inventory data and condition assessment approach for revenue vehicles.
- **Section 3** describes the inventory data and condition assessment approach for facilities.
- **Section 4** describes the inventory data and condition assessment approach for fixed guideway.
- **Section 5** describes the inventory data and condition assessment approach for equipment.
- **Appendix A** includes a detailed list of assessment items for Administrative and Maintenance Facilities
- **Appendix B** includes recommended inspection procedures for Administrative and Maintenance Facilities
- **Appendix C** includes a detailed list of assessment items for Passenger Facilities
- **Appendix D** includes a detailed asset hierarchy for rail guideway

2.0 Revenue Vehicles

2.1 Inventory Data

Revenue vehicles are inventoried by vehicle fleet. All vehicles in a given fleet share the same vehicle type, make/model, model year, and operator. Other inventory data collected for a fleet may include, but is not limited to, vehicle length and fuel type. Figures 1 to 4 illustrate the asset hierarchy for revenue vehicles. Figure 1 shows three subclasses of vehicles: bus, rail, and ferryboat. Figure 2 shows the five vehicle types defined for buses, Figure 3 shows the six defined for rail, and Figure 4 shows the three for ferry.

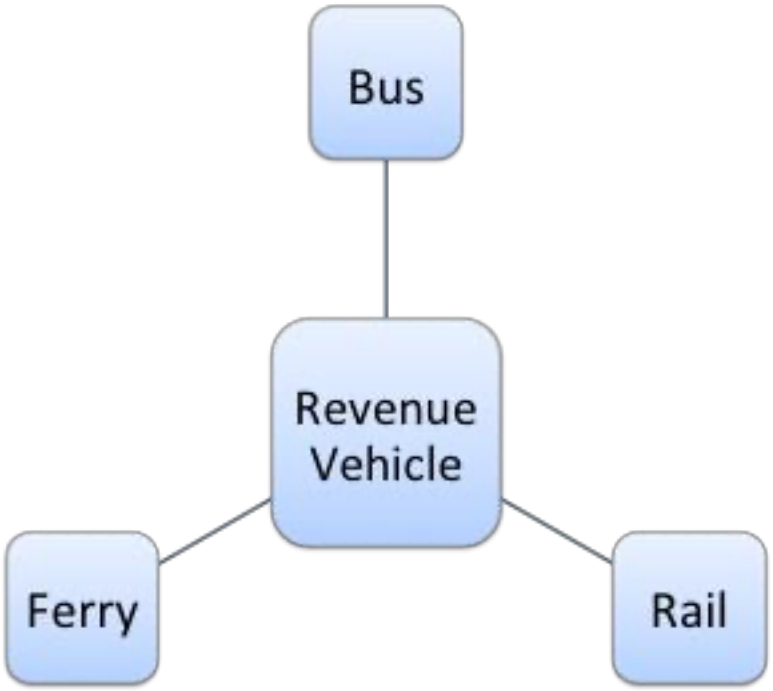

Figure 1. Asset Hierarchy – Revenue Vehicles

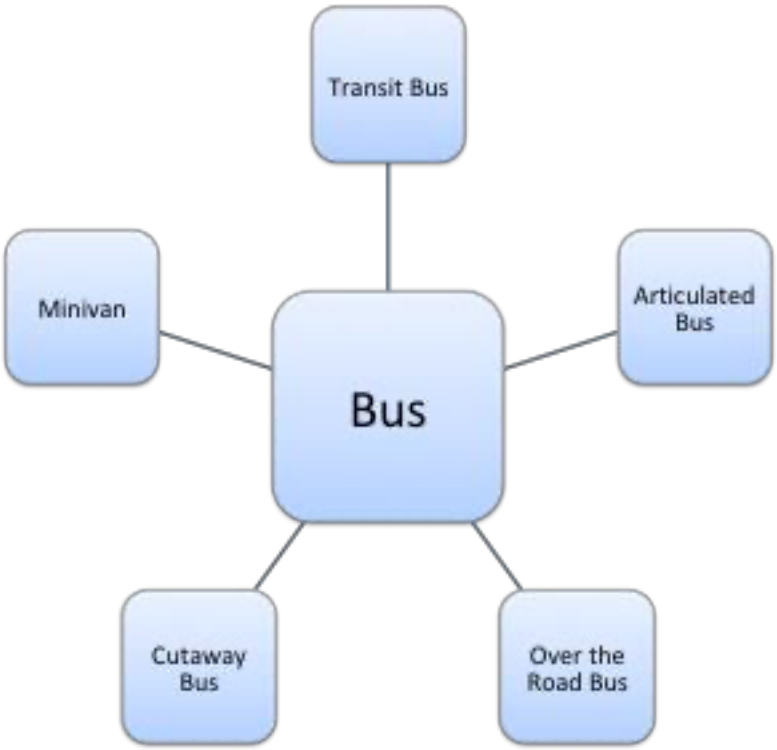

Figure 2. Asset Hierarchy – Revenue Vehicles – Bus

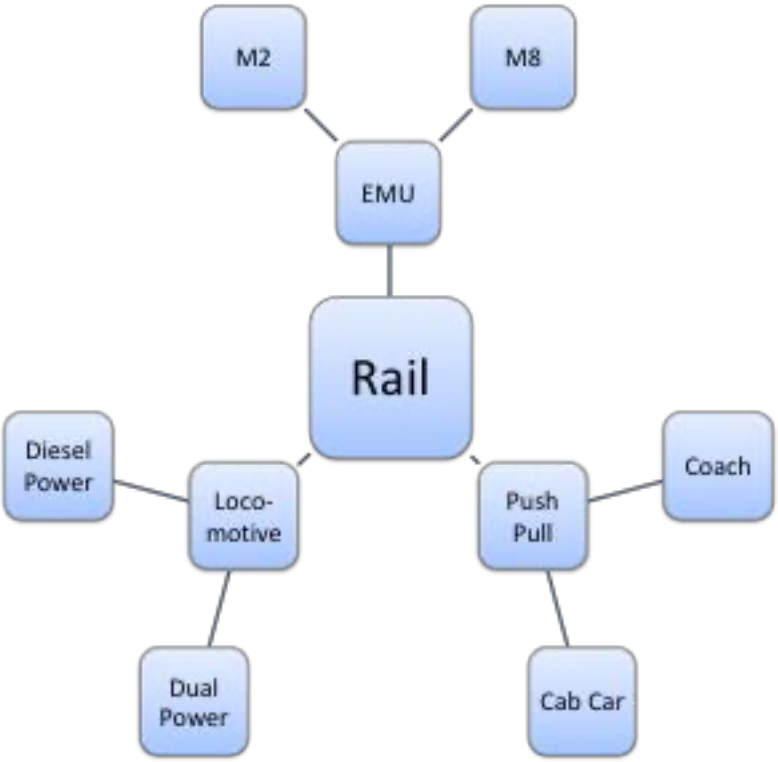

Figure 3. Asset Hierarchy – Revenue Vehicles – Rail

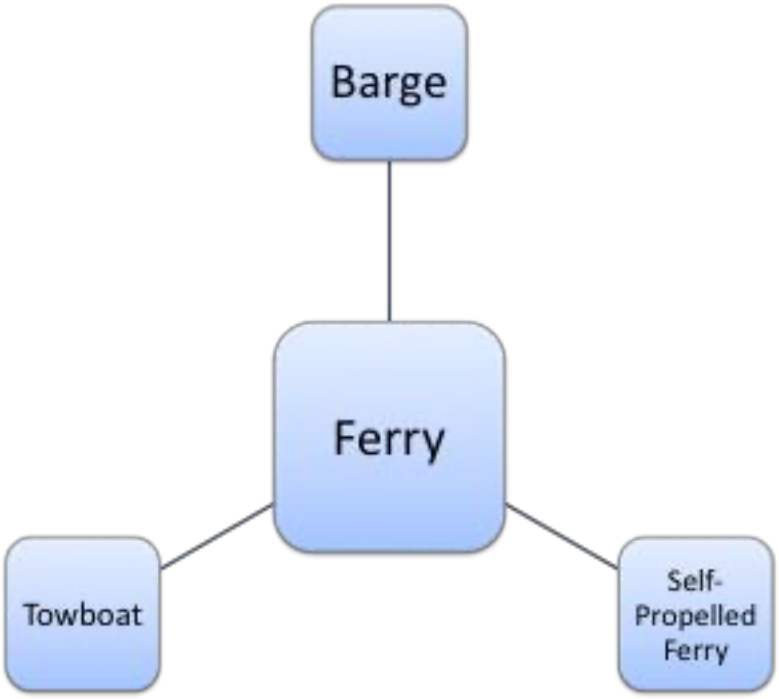

Figure 4. Asset Hierarchy – Revenue Vehicles – Ferry

2.2 Condition Assessment Approach

The purpose of the vehicle condition assessment is to provide an overall snapshot of the current state of repair of a vehicle fleet to aid in decisions concerning when it is most cost effective to replace it.

FTA's mandated SGR performance measure for revenue vehicles is the percentage of vehicles that have met or exceed their Useful Life Benchmark (ULBs). The ULB is age at which a vehicle has reached the end of its economic useful life. This value may be specified in terms of vehicle age, mileage and/or other factors. FTA provides a set of default ULB values by vehicle type, all of which are specified in terms of vehicle age.

Following FTA's model, CTDOT uses fleet age as its indicator of vehicle condition. A vehicle is deemed to be in good repair if its age is less than the ULB specified for the corresponding vehicle type. Likewise, a vehicle is deemed to no longer be in good repair if its age equals or exceeds the corresponding ULB.

CTDOT has worked with their Tier I and Tier II service providers in Connecticut to define custom ULB values. Connecticut's ULB values for revenue vehicles are listed in Table 1.

Table 1. ULB Values for Revenue Vehicles

Tier I	Tier II	Asset Class	ULB (years)
●	●	Transit Bus	12
●		Articulated Bus	12
●	●	Cutaway Bus	5
●		Over the Road Bus	12
	●	Minivan	5
●		Rail Locomotive (Dual Power or Diesel)	25
●		Rail Push Pull (Coach or Cab Car)	25
●		Rail Electric Multiple Unit (M2 or M8 RMU)	25
●		Ferryboat	42

2.3 Assessment of Existing Data

Inventory data including model year (used to determine age) are stored by vehicle in CORE-CT and in inventory registries of Connecticut transit providers including the 12 transit districts participating in the Connecticut Group TAM Plan. For the purpose of developing its TAM Plan, CTDOT extracted revenue vehicle data from CORE-CT and transit providers, aggregated it by fleet, and imported the data into a separate transit asset inventory database, SGRtransdata.

3.0 Facilities

Two types of transit facilities are defined in the Connecticut SGR database: administrative/ maintenance facilities, and passenger facilities. The condition assessment approach is similar for both facility types, and relies on visual inspection of primary facility components. However, the specific facility components and available data differ between the two types of facilities. Section 3.1 discusses the recommended condition assessment approach for administrative/ maintenance facilities and Section 3.2 discusses the recommended approach for passenger facilities.

3.1 Administrative/Maintenance Facilities

3.1.1 Inventory Data

For administrative/maintenance facilities both the overall facility site and each individual building on the site are included in the inventory. In some cases, there may be only one building on a given site, but larger facilities may include multiple buildings.

Inventory data for the facility site may include, but is not limited to, the site address, operator and land area. Inventory data for buildings may include, but is not limited to, the operator, floor area, construction cost and date.

3.1.2 Condition Assessment Approach

The purpose of the facility condition assessment is to provide an overall snapshot of the current state of repair of a facility to aid in decisions concerning capital investments to improve the facility's condition. This section describes how to assess the condition of an administrative/ maintenance facility.

The approach described here is based on FTA's guidance detailed in *TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation*. FTA's guidance is intended to support calculation of FTA's mandated SGR performance measure for facilities, which is the percentage of facilities within an asset class rated less than three on the five-point scale used in the FTA Transit Economic Requirements Model (TERM). As described in FTA's guidance document, the components were established based upon American Society of Testing and Materials (ASTM) documents that provide standards for classification of buildings and related features, but these have been customized in certain respects to address common features of transit facilities.

To assess facility conditions an inspector should assign a value of 1 to 5 to each of the major components of the facility. The condition rating values and their descriptions are listed in Table 2. The components are listed in Table 3. Specific subcomponents the inspector should examine for each component are listed in Appendix A. The inspector may wish to assess the condition of these individual sub-components or simply use the list as a reference when performing the inspection. Further, when performing inspections at a sub-component level for certain sub-components, the inspector may wish to specify the percentage of the sub-component quantity in each condition rather than a single, overall condition. If sub-component conditions are assessed they should be aggregated to obtain an overall score for the component using the approach

described here for aggregating component scores. Suggested inspection procedures are included in Appendix B.

Table 2. FTA TERM Condition Assessment Scale

Rating	Condition	Description
5	Excellent	No visible defects, new or near new condition, may still be under warranty if applicable
4	Good	Good condition, but no longer new, may be slightly defective or deteriorated, but is overall functional
3	Adequate	Moderately deteriorated or defective; but has not exceeded useful life
2	Marginal	Defective or deteriorated in need of replacement; exceeded useful life
1	Poor	Critically damaged or in need of immediate repair; well past useful life

The specific components of administrative/maintenance facilities are listed below. Note that the first nine components listed in the table should be assessed for each building in the facility, and the final component, Site, should be assessed for the site as a whole.

Table 3. Administrative/Maintenance Facility Condition Assessment Components

Inventory Unit	Component	Notes	Typical Useful Life* (years)	Component Condition Weight**
Building	Substructure		30	1.0
Building	Shell		30	1.0
Building	Interior		30	1.0
Building	Plumbing	May need to assess based on age	20	1.0
Building	HVAC	May need to assess based on age	20	1.0
Building	Electrical	May need to assess based on age	30	1.0
Building	Fire Protection	See Table 5	20	1.0
Building	Conveyance	See Table 5	20	1.0
Building	Equipment	Includes fixed specialty equipment	30	1.0
Site	Site		50	1.0

*Useful life can be utilized for components that cannot be visually inspected.
**Component Condition Weight represents the relative importance of the component compared to other components. By default, these numbers are 1.0. However, based on the agency's experiences and practices, the inspector can use a different number to lower or raise the importance of a component and thus change how component conditions impact the overall facility condition.

For some components, a visual inspection may be insufficient for establishing conditions. In cases where the inspector finds that he or she cannot assess conditions of a component visually, the inspector should estimate the age of the component (the time since it was constructed or last rehabilitated), and estimate the condition based on the age using useful life for the component listed in Table 3 with the scale shown in Table 4. Useful life is the average amount of time in years that an item, component, or system is economically efficient to keep in operation. This approach will typically be required for Plumbing, HVAC and Electrical, but may also be required for other components. Refer to the discussion of rail guideway assets and Table 7 for further details on this conversion scale.

Table 4. Conversion Scale: Component Age to FTA TERM Condition Rating

Component Age as % of Useful Life	Rating	Condition
New	5	Excellent
≤ 50%	4	Good
>50% ≤100%	3	Adequate
>100% ≤125%	2	Marginal
>125%	1	Poor

For Fire Protection and Conveyance, separate inspections are typically performed to assess code compliance. The inspector should utilize the results from those inspections in performing their condition assessment. Specifically, the inspector should use the condition assessment scale shown in Table 5 for these components.

Table 5. Fire Protection and Conveyance Condition Assessment Scale

Rating	Condition	Description
5	Excellent	System is new and there are no identified code issues
4	Good	System is not new, but there are no identified code issues
3	Adequate	Isolated code issues exist that can be addressed through maintenance
2	Marginal	Code issues exist that do not necessitate facility closure
1	Poor	Extensive code issues have been identified that may necessitate facility closure

Given the individual component conditions, the overall condition of the facility is calculated as:

$$Condition = \frac{\sum_{i=1}^{n} c_i f_i r_i}{\sum_{i=1}^{n} f_i r_i}$$

where c_i is the condition of component i, f_i is the replacement cost factor listed in Table 3, and r_i is the replacement cost of the component.

3.1.3 Assessment of Existing Data

Inventory data on Connecticut facilities are stored in CORE-CT and the transit providers' asset registries, but the level of detail stored on each facility varies. Thus, for the purpose of developing its TAM Plan, CTDOT extracted data on administrative/maintenance facilities from CORE-CT and the transit providers' asset registries, then manually reviewed data for each facility. Except in the case of a selected Tier II facilities that have been recently inspected, component-level condition data are not available for administrative/maintenance facilities. However, the overall condition of CTDOT-owned facilities has been previously established. Thus, component-level conditions were manually determined for each facility using the available component-level data, overall facility condition, and facility age. Data for each facility and building were imported into the transit asset inventory database, SGRtransdata.

3.2 Passenger Facilities

3.2.1 Inventory Data

For passengers facilities the overall facility site, each individual building on the site, and each rail platform (if applicable) are included in the inventory. In some cases, there may be only one building and/or platform on a given site, but larger facilities may include multiple buildings and/or platforms.

Inventory data for the facility site may include, but is not limited to, the site address, operator and land area. Inventory data for buildings may include, but is not limited to, the operator, floor area, parking spaces (for parking lots), construction cost and date.

3.2.2 Condition Assessment Approach

The condition assessment approach for passenger facilities is similar to that for administrative/maintenance facilities. The approach described here is based on FTA's guidance detailed in *TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation*. FTA's guidance is intended to support calculation of FTA's mandated SGR performance measure for facilities, which is the percentage of facilities within an asset class rated less than three on the five-point TERM scale.

To assess facility conditions an inspector should assign a value of 1 to 5 to each of the major components of the facility. The condition rating values and their descriptions are listed in Table 2. The components are listed in Table 6. Specific subcomponents the inspector should examine for each component are listed in Appendix C. The inspector may wish to assess the condition of these individual sub-components or simply use the list as a reference when performing the inspection. Further, when performing inspections at a sub-component level, for certain sub-components the inspector may wish to specify the percentage of the sub-component quantity in each condition rather than a single, overall condition. If sub-component conditions are assessed they should be aggregated to obtain an overall score for the component using the approach described here for aggregating component scores. Suggested inspection procedures are included in Appendix B.

Regarding the specific components of passenger facilities, note that first nine listed in the table

below should be assessed for each building in the facility. Three components should be assessed for each platform, and Site should be assessed for the site as a whole.

Table 6. Passenger Facility Condition Assessment Components

Inventory Unit	Component	Notes	Typical Useful Life (years)*	Component Condition Weight**
Building	Substructure		30	1.0
Building	Shell		30	1.0
Building	Interior		30	1.0
Building	Plumbing	May need to assess based on age	20	1.0
Building	HVAC	May need to assess based on age	20	1.0
Building	Electrical	May need to assess based on age	30	1.0
Building	Fire Protection	See Table 5	20	1.0
Building	Conveyance	See Table 5	20	1.0
Building	Fare Collection		20	1.0
Platform	Structure		30	1.0
Platform	Canopy		30	1.0
Platform	Electrical		30	1.0
Site	Site		50	1.0

*Useful life can be utilized for components that cannot be visually inspected.
**Component Condition Weight represents the relative importance of the component compared to other components. By default, these numbers are 1.0. However, based on the agency's experiences and practices, the inspector can use a different number to lower or raise the importance of a component and thus change how component conditions impact the overall facility condition.

The other details of the assessment process are identical to that described previously for administrative/maintenance facilities. Table 4 lists rating values to use if the inspector uses age as a proxy for condition. Table 5 lists specific condition assessment language to use for fire protection and conveyance. Given the individual component conditions, the overall condition of the facility is calculated as:

$$Condition = \frac{\sum_{i=1}^{n} c_i f_i r_i}{\sum_{i=1}^{n} f_i r_i}$$

where c_i is the condition of component i, f_i is the replacement cost factor listed in Table 6, and r_i is the replacement cost of the component.

3.2.3 Assessment of Existing Data

Inventory data on Connecticut facilities are stored in CORE-CT and the transit providers' asset registries, but the level of detail stored on each facility varies. Thus, for the purpose of developing its TAM Plan, CTDOT extracted data on passenger facilities from CORE-CT and the transit providers' asset registries, and then manually reviewed data for each facility to establish the inventory. Data for each facility, platform and building were imported into the transit asset inventory database, SGRtransdata.

Existing condition data available for passenger facilities varied by specific type of facility. For Tier II facilities and for CTfastrak stations, an overall condition rating was assigned. For these facilities, component-level conditions were manually determined for each facility using the overall facility condition and facility age.

For rail stations, more detailed assessments were recently performed. These inspections were performed for different facility components using the 10-point National Bridge Inventory (NBI) condition scale (with values ranging from 0 to 4) rather than the 5-point TERM scale described here. NBI conditions were converted to the TERM scale by dividing the rating by 2 and then rounding to the nearest integer value. Thus, a component was deemed to have a TERM rating of 2 if its NBI rating was 5 (fair) or less.

The rail facility inspections were mapped to component conditions as follows:

- The condition for Substructure was established based on the value for Foundations.
- The condition for Shell was established based on the minimum of Roof and Exterior Walls.
- The condition for Interior was established based on the minimum of Interior Walls, Floors, Windows/Skylights/Doors, Stairs/Ramps and Walking Surfaces.
- The condition for Plumbing was established based on the minimum of the two ratings for Drainage and the rating for Restrooms.
- The condition for HVAC was established based on the minimum of HVAC, Duct Work, Compressors, and Blowers.
- The condition for Conveyance was established based on the minimum of Elevator Pit, Elevator Machine Room, Elevator Cab, and Escalator.
- The condition for Site was established based on the value for Site-Electrical.

For rail platforms, the condition was determined for the components Structure, Canopy and Electrical. For each of these the condition was determined by taking the minimum of the subcomponent ratings.

The station data included information on station bridges, but this was considered to be part of the data set of Fixed Guideway – Structures.

4.0 Fixed Guideway

Two types of fixed guideway are defined in the Connecticut SGR database: rail, and bus. Rail guideway includes the Connecticut-owned portion of the Northeast Corridor, as well as three branch lines: New Canaan, Danbury and Waterbury. The inventory is structured such that additional freight rail guideway and related assets may be added if desired. Bus guideway includes the pavement, bridges and ancillary assets associated with the CTfastrak guideway running from New Britain to Hartford. Section 4.1 discusses the recommended condition assessment approach for rail guideway and Section 4.2 discusses the recommended approach for bus guideway.

4.1 Rail

4.1.1 Inventory Data

Rail fixed guideway inventory data is organized into four primary categories: track, power, structure, and signals/communications, as depicted in Figure 5. Each of these four categories is further divided into a two-level hierarchy. Note the hierarchy is based on that recommended by Metro North Railroad (MNR) based on that agency's work to implement a new enterprise asset management system. The rail guideway asset hierarchy is presented in detail in Appendix D.

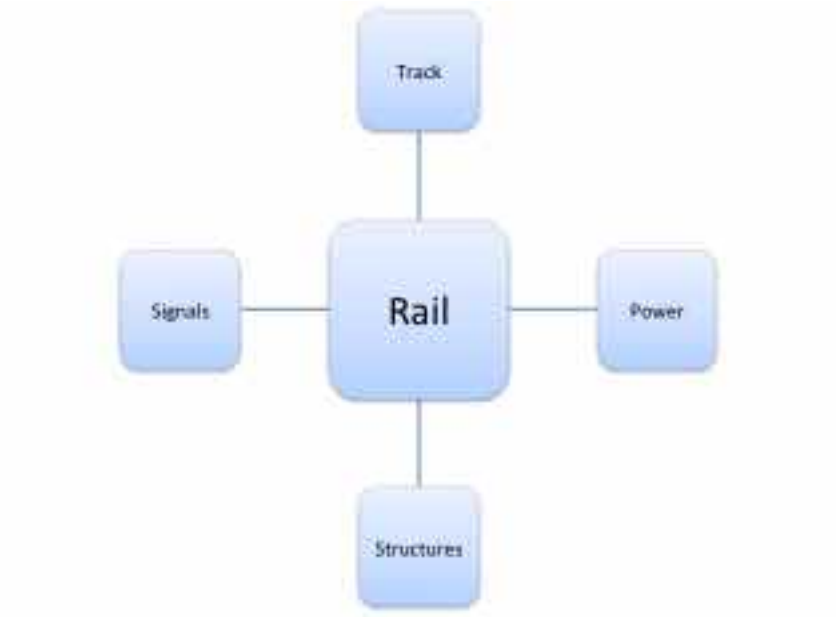

Figure 5. Asset Hierarchy – Fixed Guideway – Rail

Figure 6 shows the hierarchy for Track. Track is classified Main or Special. Main track is further divided into five subcategories, and special track is further divided into two subcategories. Track is inventoried by segment.

Figure 7 shows the hierarchy for Power. Power is divided into four subcategories: Supply System Traction Power; Supply System Transmission Power; Traction Power Distribution; and Signal Power System. Each of these is further divided into four subcategories. Assets in the subcategories Supply System Traction Power, Supply System Transmission Power, and Signal

Power System are inventoried by site (e.g., by substation). Traction Power Distribution is inventoried by track segment.

Figure 8 shows the hierarchy for Structures. Three basic categories of structures are defined: Undergrade Structure; Retaining Wall and Overhead Structure. Each of these is further subdivided into two or three subcategories. Each individual structure is included in the inventory.

Figure 9 shows the inventory for Signals/Communications. This subcategory is further divided into the following: Signaling; Train Detection Control; Communication/Monitoring; Security System; and Positive Train Control. Assets in this subcategory are inventoried by piece of equipment.

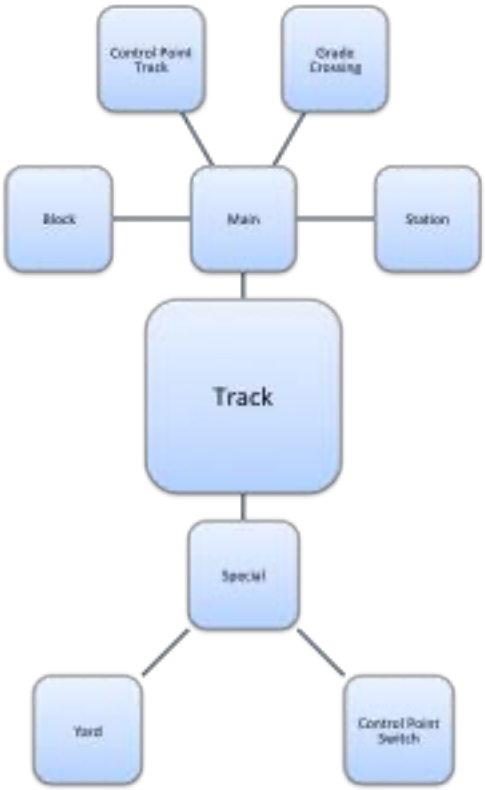

Figure 6. Asset Hierarchy – Fixed Guideway – Rail – Track

Figure 7. Asset Hierarchy – Fixed Guideway – Rail – Power

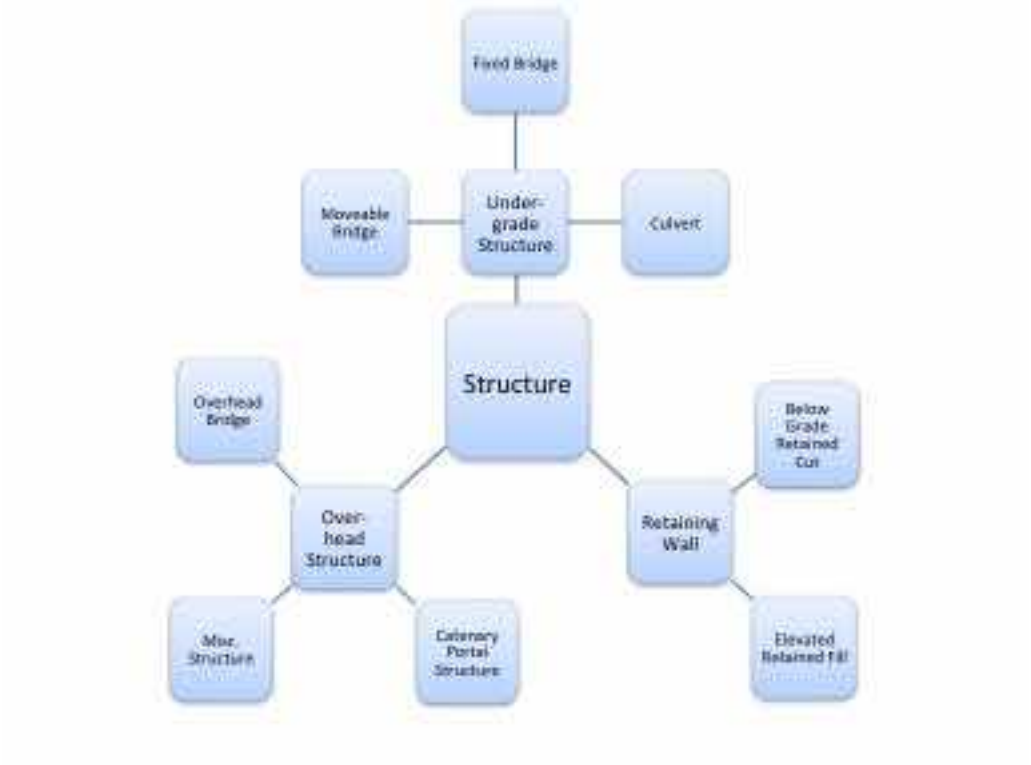

Figure 8. Asset Hierarchy – Fixed Guideway – Rail – Structure

Figure 9. Asset Hierarchy – Fixed Guideway – Rail – Signal/Communications

4.1.2 Condition Assessment Approach

MNR and Amtrak have each identified a need for a comprehensive condition assessment approach for assessing rail guideway on the Northeast Corridor. Such an approach would ideally consider results of visual inspections, including track walks and other forms of inspection already performed on a routine basis, results obtained from inspection by rail geometry car, and other inputs. However, no such comprehensive approach has yet been defined. Thus, both MNR and Amtrak use asset age as a proxy for condition for most assets, with the notable exception of structures.

For all rail guideway assets other than structures, CTDOT assesses condition based on asset age, using an approach patterned on current MNR and Amtrak practices. For each asset type a ULB value is specified in years. Asset condition is then approximated by comparing the age of the asset (years since it was either constructed or last rehabilitated) to the ULB. A condition rating is assigned on the five-point TERM scale based on Table 7.

As described below in 4.1.3, MNR rail guideway asset data has four condition categories, each defined by age relative to useful life. CTDOT adapted this approach and added a fifth condition category (New/5/Excellent) to allow for mapping of MNR condition data to the TERM five-point scale.

Table 7. Conversion Scale: Rail Guideway Asset Age to FTA TERM Condition Rating

Asset Age as % of ULB	Rating	Condition
New	5	Excellent
≤ 50%	4	Good
>50% and ≤100%	3	Adequate
>100% and ≤125%	2	Marginal
>125%	1	Poor

ULB values for rail guideway assets are discussed in Section 4.1.3.

For structures a detailed assessment approach has already been defined and implemented. CTDOT performs visual inspections of structures in the subcategories Undergrade Structure and Overhead Structure. These are patterned on the approach used for highway bridges. Through the inspection CTDOT assess condition of the bridge deck, superstructure and substructure condition using the 10-point National Bridge Inventory (NBI) condition scale (with values ranging from 0 to 4) rather than the 5-point TERM scale described here. For culverts a single overall culvert rating is specified.

4.1.3 Assessment of Existing Data

Pending implementation by MNR of its new enterprise asset management system, the system of record for data on the rail guideway inventory is the set of track charts maintained for the Northeast Corridor and branch lines. The charts show locations of major assets, and detail when assets were most recently rehabilitated. However, the track charts do not provide the level of detail required to populate the asset inventory illustrated in Figures 6 to 9.

As a supplement to the track charts, MNR maintains a less detailed, summary inventory of rail guideway assets for use in preparation of the Metropolitan Transportation Authority (MTA) Ten Year Needs Assessment (TYNA). This summary inventory groups assets by ULB, and details the asset quantities in each of four condition categories:

- 1: 0 to 50 percent of useful life (4 or 5 on the TERM scale)
- 2: 50 to 100 percent of useful life (3 on the TERM scale)
- 3: 100 to 125 percent of useful life (2 on the TERM scale)
- 4: more than 125 percent of useful life (1 on the TERM scale)

Based on the above definitions, an asset in Category 3 or 4 (1 or 2 on the TERM scale) has exceeded its useful life and is not in good repair. However, in some cases MNR has established that an asset is still in good repair, despite exceeding its useful life, or alternatively, that it is no longer in good repair though it is still less than its useful life. To address such situations MNR tracks assets in a second set of categories that mirror the first set, but include adjustments for engineering judgment.

The MNR data were used to populate data on Track and Power in the CTDOT database. Table 8 summarizes the assets in the summary inventory for Track. Table 9 summarizes the assets for Power.

Table 8. MNR TYNA Summary Inventory - Rail

Category	Subcategory	ULB (years)
Rail	Tangent	40
	Curves <2 degrees	30
	Curves 2-4 degrees	20
	Curves >4 degrees	10
Ties	Concrete	40
	Wood	30
Turnouts	High Speed	25
	Mainline	20
	Yard	30
	Siding	30
Surfacing	Interlockings	4
	Control Point to Control Point	4

Table 9. MNR TYNA Summary Inventory - Power

Category	Subcategory	ULB (years)
Catenary Plant	Overhead Catenary	50
	Sectionalizing Insulators	3
	Synthetic Insulators	3
	Pulleys	15
Cable Plant	AC Feeder Cable	40
	Signal Power 12kV	50
	Catenary Poles	100
AC Substation Plant	Metal Clad	30
	RTU Sectionalizing	30
	Substation Wayside Switchyard	30
	Anchor Bridge Substation	30
	Snow Melter Transformers/Unit Substation	30
	Supply Stations	40
	MOD's	20
Signal Power Plant	Substations	20
	MOD's	20
	Transformers	30
Transmission Plant	Transformers, Small Pad Mount	40
	Yard Power Distribution System	30

CTDOT's existing structures data were used to populate the data for the category Structure. Condition data in the existing data set are expressed using the 10-point NBI scale. NBI conditions were converted to the TERM scale by dividing the rating by 2 and then rounding to the nearest integer value. Thus, a component was deemed to have a TERM rating of 2 if its NBI rating was 4 (poor) or less.

For the category Signals work remains to be performed to develop a full inventory. Thus, for this category the CTDOT inventory has entries for the Northeast Corridor, New Canaan Branch, Danbury Branch, and Waterbury Branch.

4.2 Bus

4.2.1 Inventory Data

Asset categories defined for Bus Fixed Guideway include Pavement and Structure. CTDOT's approach for inventorying these assets is to extend the approach used for highway assets, for which existing systems and approaches are well defined.

4.2.2 Condition Assessment Approach

For pavement CTDOT uses a Pavement Condition Index (PCI) to measure the condition of CTDOT-maintained pavements. PCI is calculated for each 0.1-mile segment based on five metrics. The overall PCI is a weighted average of the following metrics shown in Table 10 below.

Table 10. Pavement Condition Index Metrics

Metric	Weight	Description
Roughness	10%	An indicator of pavement roughness experienced by road users traveling over the pavements. The International Roughness Index (IRI) is computed from a single longitudinal profile
Rutting	15%	Rutting is quantified for asphalt pavements by measuring the depth of ruts along the wheel path. Rutting is commonly caused by a combination of high traffic volumes, heavy vehicles and the instability of the pavement mix.
Cracking	25%	Cracks in the pavement surface can be caused or accelerated by aging, loading, poor drainage, frost heaves or temperature changes, or construction flaws. Cracking is measured in terms of the percentage of cracked pavement surface.
Disintegration	30%	Disintegration is the wearing away of the pavement surface caused by the dislodging of aggregate particles and loss of asphalt binder. CTDOT calculates the disintegration metric using pavement age.
Drainage	20%	Drainage refers to the ability of the surface of the roadway to drain. CTDOT uses the collected cross slope and grade of the roadway to compute the drainage metric

The PCI is scaled from 1.0 to 9.0, with 9.0 describing a pavement without defects. Within this

scale, roadways with a PCI less than 4.0 are classified in “Poor” condition, those between 4.0 and less than 6.0 are in “Fair” condition, 6.0 to less than 8.0 PCI indicates “Good” condition, and 8.0 to 9.0 indicates “Excellent” condition. A pavement section for which the PCI is 6 or greater is classified as being in a state of good repair.

For structures CTDOT uses a similar approach for rail and highway bridges. As described previously, bridges are inspected visually. Conditions of bridge decks, superstructures and substructures are assessed using the 10-point NBI scale.

4.2.3 Assessment of Existing Data

CTDOT collects pavement inventory and condition data using specially equipped Fugro Roadware Automatic Road Analyzer (ARAN) vans. The entire CTDOT-maintained mainline is measured each year. CTDOT performed an initial data collection run of CTfastrak guideway in March 2015, prior to the system opening. CTDOT is establishing a process for regular data collection, data processing, and integration with the Pavement Management System.

CTDOT has already inventoried and inspected the bridges on the CTfastrak guideway and is managing these together with other highway bridges.

5.0 Equipment

5.1 Inventory Data

The Equipment asset class includes service vehicles and other equipment with a value of $50,000 or more. Service vehicles are inventoried by vehicle fleet. All vehicles in a given fleet share the same vehicle type, make/model, model year, and operator. Figure 10 shows the different types of service vehicles inventoried, including four types of "rubber tire" vehicles and two types of rail service vehicles.

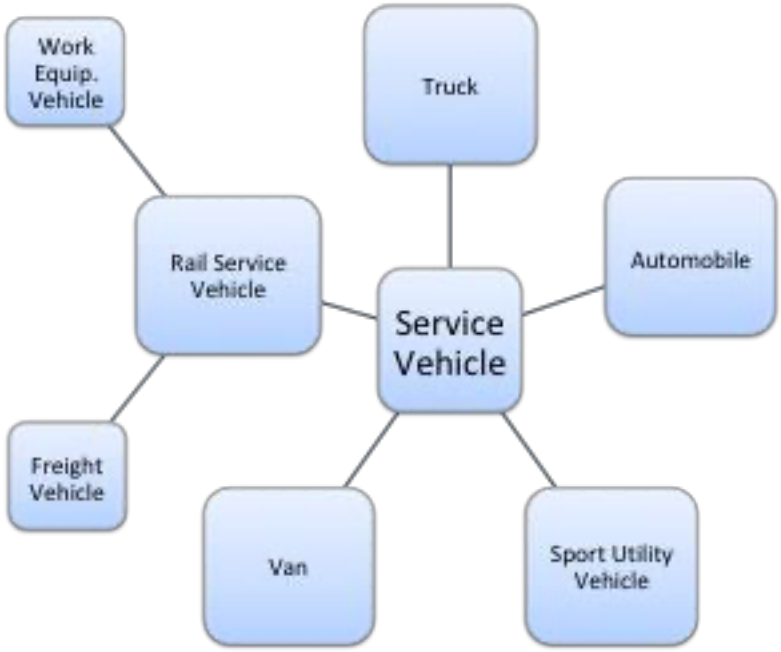

Figure 10. Asset Hierarchy – Equipment – Service Vehicles

Other equipment is inventoried by specific item. Inventory data include, but are not limited to, item descriptions, purchase cost, and purchase date.

5.2 Condition Assessment Approach

CTDOT uses the same basic approach for assessing condition of equipment as it does for revenue vehicles. This approach is discussed in Section 2. Specifically, A ULB value is established for equipment type. A piece of equipment is assessed as being in good repair if its age is less than the corresponding ULB, and not in good repair if it meets or exceeds the ULB. This approach supports reporting of FTA's mandated SGR performance measure for equipment: the percentage of service vehicles that have met or exceed their ULB. Connecticut's ULBs for equipment are listed in Table 11.

Table 11. ULBs for Equipment

Tier I	Tier II	Asset Class	ULB (years)
●	●	Trucks and Rubber Tire Vehicles	14
●	●	Automobiles	5
●	●	Sport Utility Vehicles	5
●		Steel Wheel Vehicles	25
●	●	Vans	5

5.3 Assessment of Existing Data

Inventory data including model year (used to determine age) are stored by service vehicle in CORE-CT and the transit providers' asset registries. For the purpose of developing its TAM Plan, CTDOT extracted revenue vehicle data from CORE-CT and the transit providers' asset registries, aggregated it by fleet, and imported the data into a separate transit asset inventory database, SGRtransdata.

For other equipment inventory data, such as equipment description, purchase cost, and purchase date, are stored in CORE-CT and the transit providers' asset registries as well. CTDOT extracted data on other equipment, filtering out data for items costing less than $50,000 or permanently affixed to a facility, and imported the data into SGRtransdata.

Appendix A. Detailed List of Items for Admin / Maintenance Facility Condition Assessment

Tables A-1 through A-10 present detailed lists of items for condition assessment at administration or maintenance facilities. The tables are organized by the ten components described in the approach. In addition to the items, the tables include notes for inspection (where applicable) and units of measure. This information in this appendix is also included in a separate spreadsheet.

Where these items are assessed, one would typically assign an overall value to the item. But in cases where units of measures are not “inspect as each”, an inspector may determine the percentage of total quantity in each condition.

Table A-1. Substructure

Category	Item	Notes	Unit of Measure
Foundations	Exposed Foundation Elements		inspect as each
	Other Structural Components		inspect as each
Basement	Slab		sq. ft.

Table A-2. Shell

Category	Item	Notes	Unit of Measure
Superstructure	Structural Frame	Columns, pillars, walls	inspect as each
Roof	Roof Waterproofing		inspect as each
	Roof Penetration Flashing Systems	Chimney, skylights, eaves, surroundings	inspect as each
	Roof Drainage Systems	Gutters	inspect as each
Exterior	Building Envelope - Masonry/Concrete Walls		sq. ft.
	Building Envelope - Cladding		sq. ft.
	Building Envelope - Windows and Glazing		sq. ft.
	Building Envelope - Doors, Glazing, Door Hardware		sq. ft.
	Building Envelope - Garage Doors		sq. ft.
	Bird Proofing System		inspect as each
	Exterior Finishes		inspect as each
Shell Appurtenances	Means of Egress	Stairs, fire escapes	inspect as each
	Vertical Openings		inspect as each
	Cat Walks		inspect as each
	Inspection Pits		inspect as each
Building Expansion Joints	Building Expansion Joints		linear ft.

Table A-3. Interior

Category	Item	Notes	Unit of Measure
Partitions	Interior Walls		sq. ft.
	Interior Windows and Glazing		sq. ft.
	Interior Doors, Glazing, Door Hardware		sq. ft.
Stairs	Interior Stairs and Landings		units
Finishes	Flooring System		sq. ft.
	Ceiling System		sq. ft.
	Wall Finishes		sq. ft.
Other	Interior Amenities	Signage, built-in furnishings, appliances	inspect as each
	Built-In Seating		inspect as each

Table A-4. Plumbing

Category	Item	Notes	Unit of Measure
Domestic Water Distribution	Water Heaters		inspect as each
	Water Treatment Systems		inspect as each
	Backflow Prevention		inspect as each
Pumps	Pumps	Sump, well, domestic	inspect as each
Bathroom Fixtures	Bathroom Fixtures		inspect as each
Other Plumbing Items / Fixtures	Other Plumbing Fixtures	Piping, insulation, etc.	inspect as each

Table A-5. HVAC

Category	Item	Notes	Unit of Measure
HVAC	Energy Recovery Units		units
	Heat Pumps		units
	Make-Up Units		units
	Air Handling Units		units
	Boilers		units
	Burners		units
	Furnaces		units
	Unit Heaters		units
	Radiant Heaters		units
	Finned Tube Radiation and Convertors		units
	Air Conditioning Units	Split package, commercial through-the-wall, water-cooled package	units
	Splits and Mini-Splits		units
	Cooling Towers		units
	Condensers	Air-Cooled, evaporative	units
	Chillers		units
	HVAC Air Terminals		units
	Fans	Centrifugal, axial, roof-mounted, propeller	units
	Coils		units
	Heat Exchangers		units
	Reciprocating Compressors		units
	Air Curtains		units
	Water Treatment System		inspect as each
	Other HVAC Pumps (excluding heat pumps)		inspect as each
	Other HVAC Components	Piping, ductwork, etc.	inspect as each

Table A-6. Electrical

Category	Item	Notes	Unit of Measure
Electrical Service / Distribution	Power Distribution / Switchgear	Service entrance through subpanels	inspect as each
	Generator and Transfer Switch		inspect as each
	Transformers	Non-utility owned only	inspect as each
	DC Power Substation / Traction Power Substation		inspect as each
	AC Power Substation		inspect as each
	Service Panels		inspect as each
Backup Power	Uninterruptible Power Supply (UPS)		inspect as each
Lighting	Interior Lighting		inspect as each
	Exterior Lighting		inspect as each
Other Electrical	Other Electrical Components	Conduits, etc.	inspect as each
Lightning Protection System	Lightning Protection System		inspect as each

Table A-7. Fire Protection

Category	Item	Notes	Unit of Measure
Fire Protection	Fire Detection System		inspect as each
	Fire Suppression Systems	Sprinklers, standpipes, extinguishers, hydrants	inspect as each

Table A-8. Conveyance

Category	Item	Notes	Unit of Measure
Elevators	Elevators		units
Escalators	Escalators		units
Lifts	Passenger Lifts		units

Table A-9. Equipment

Category	Item	Notes	Unit of Measure
Stationary Equipment	Hydrogen Fuel Cells		inspect as each
	Photovoltaic Panels		inspect as each
	Paint Booths		inspect as each
	Air Compressors		inspect as each
	Special Work Station Ventilation	Vehicle, welding, soldering, etc.	inspect as each
	Vehicle Washing Equipment		inspect as each
	Fall Protection Systems		inspect as each
	Rail Car Wash		inspect as each
	Sand Blasting System		inspect as each
	Radio Cell Towers		inspect as each
	In-Ground Lifts		inspect as each
	Other Stationary Equipment		inspect as each

Table A-10. Site

Category	Item	Notes	Unit of Measure
Site Equipment	Motor Fuel Island Tanks and FMU		units
	Tank Monitoring System		units
	Fuel Oil Tank		units
	Potable Water Tank		units
	Propane Tank		units
	Generator Tank	Independent from generator, i.e. not a base tank	units
	Chloride and Brine Storage Tanks		units
	Chloride System		inspect as each
	Brine System		inspect as each
Roads / Parking Lots / Sidewalk / Curbing	Access Road		sq. ft.
	Parking Lots		sq. ft.
	Sidewalks and Walkways		sq. ft.
	Pavement Markings		inspect as each
	Bollards and Handrails		inspect as each
Security	Fences		linear ft.
	Gates and Barrier Arms		inspect as each
	Camera / Surveillance System		inspect as each
	Guard Shack		inspect as each
Site Septic, Environmental, & Stormwater Management	Waste Oil Tank		units
	Waste Antifreeze Tank		units
	Wastewater Management / Drainage		inspect as each
	Oil-Water Separator Tank		units
	Sanitary/Stormwater Pumping Systems		inspect as each
	Septic System Tank		units
	Septic System Leaching Fields or Cesspools		inspect as each
	Septic System Reserve Field		inspect as each

For each of the items listed in Tables A-1 through A-10, an inspector may fill out the following "Yes/No" questions shown in Table A-11. These items were added following discussions with CTDOT and transit provider staff but are not directly applicable to the condition assessment ratings.

Using these questions could help an agency understand the importance of each asset while considering capital planning needs. The determination of safety critical, operations critical or the other fields could be initially made by the manager of the department in which the assets reside. The determination could then be reviewed and approved by Chief Operating Officer and Chief Financial Officer (who keeps the inventory).

An agency using these questions may want to establish further criteria for these items.

Table A-11. Yes/No Questions

Question	Description
Applicable?	Does the item exist at the facility / building? If it does, then answer Yes. If it does not, answer No.
Safety Critical?	A "Yes/No" question intended to highlight safety critical components.
Operations Critical?	A "Yes/No" question intended to highlight operations critical components.
Obsolete / Modernization?	A "Yes/No" question intended to highlight obsolete components.
Operating Savings Opportunity?	A "Yes/No" question intended to highlight operating savings opportunities.

Additional questions for an inspector to consider are listed below in Table A-12.

Table A-12. Additional Questions

Additional Questions
Is there adequate office space?
Is a break area provided?
Are male and female locker rooms and showers provided?
Is the facility ADA compliant?
Is the facility OSHA compliant?
Does a communications (data) system exist?
Does a phone system exist?

Appendix B. Recommended Inspection Procedures for Administrative and Maintenance Facilities

Facility condition assessment involves visual inspection of facility components to determine asset condition. This appendix includes recommended inspection procedures for administrative and maintenance facilities, organized by component and listed in Table B-1. These procedures are adapted from FTA's guidance document *TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation.*

Table B-1. Recommendation Facility Inspection Procedures

Component	Procedures
Substructure	• Foundations: Inspect walls, columns, pilings, other structural elements for signs of decay or structural integrity concerns. • Basement: Inspect non-foundation and structural elements such as facing materials, insulation, slab, floor underpinnings, crawl spaces, etc.
Shell (e.g., roof, exterior structure, walls)	• Inspect roof, including roof surface (tiles, membrane, shingles, gravel etc.), gutters, eaves, skylights, flashing, chimney surrounds, and sealants, hardware and painted or coated surfaces. Note evidence of ponding, or roof leaks, significant age – and other indicators that repair may be necessary. Note age of roof(s) and whether warranty is still in effect. • Inspect building envelope, façade, curtain wall system, glazing system, exterior sealants, exterior balconies, doors, stairways, and parapets. Note signs of cracks, openings, missing elements, detached elements, deteriorated sealants, and other issues that may lead to penetration of water into the building. Also, not any concerns with structural integrity. • Inspect fire escapes, noting any loose connections, deteriorated elements, or blockage, that would impact the function or safety of fire escapes. • Inspect gutters and downspouts. Note maintenance needs, need for cleaning, loose elements, and detachment. • Inspect superstructure / structural frame, including columns, pillars, and walls. Note any signs of decay or structural integrity concerns. • Inspect windows, doors, and all finishes (paint, masonry). Note any functionality or safety issues.
Interior	• Inspect soundness and finish of drywall, partitions, interior doors, fittings, ceiling tiles, and signage. • Inspect stairs including fire and access issues. • Inspect interior finishes, including materials used on walls, floors, and ceilings, such as tile, paint, and other coatings. Look for roughness and damage.
Plumbing	• Inspect fixtures and pipes for water distribution, sanitary waste, rainwater drainage, and any damage or leaks. • If not accessible, determine or estimate the age of plumbing system.

HVAC	• Inspect systems and their elements for energy supply, heating and cooling systems, distribution systems, terminal and package units, controls and instrumentation including testing and balancing, and chimneys. Specifically, inspect coils, housing, drains, and wiring and evaluate overall performance of the system. • Note apparent or reported age of the equipment, past material element replacements/ upgrades, and the apparent level of maintenance exercised. If heating equipment is shut down or not operational at the time of the walk-through survey, provide an opinion of the condition to the extent observed. Note refrigerants and fuels used and their suitability or need for improvement / upgrade. • If elements are not accessible, determine or estimate the age of the HVAC system.
Electrical	• Inspect electrical service & distribution, noting deficiencies or needed / recommended upgrades • Inspect lighting and branch wiring (interior and exterior), communications and security, noting deficiencies or needed / recommended upgrades • Examine other electrical system-related pieces such as lightning protection, generators, emergency lighting, and elements related to electrical service and distribution such as conduit, boxes, solar panels and mountings for any damage wire chaffing or loose or corroded connections. Evaluate overall performance of the system. • If elements are not accessible, determine or estimate the age of the electrical system.
Fire Protection	• Inspect sprinklers, standpipes, hydrants, fire alarms, emergency lighting, smoke evacuation, stairwell pressurization, and any other specialized elements relating to overall protection system and code compliance.
Conveyance (e.g., elevators, escalators, wheelchair lifts)	• Inspect condition, function, and code compliance of elevators, escalators, lifts, and any other fixed apparatuses for the movement of goods or people.
Equipment (e.g., lifts, washing systems)	• Inspect equipment, noting age, condition, and functional deficiencies or safety issues.
Site (e.g., sidewalks, parking lot, grounds)	• Inspect roadways/driveways and associated signage, markings, and equipment. Look for cracking or settling of the concrete or asphalt. • Inspect parking lots and associated signage, markings, and equipment. Look for cracking or settling of the concrete or asphalt • Inspect pedestrian areas and associated signage, markings, and equipment. Inspect the curbing and ramps for cracking, settling, holes, uneven surfaces and trip hazards. Pay special attention to wheelchair ramp areas and other ADA / access considerations • Site development such as fences, walls, and miscellaneous structures. Look for corrosion, structural integrity and condition of paint.

	• Landscaping, Site Utilities: Look for signs of drainage problems such as flooded areas, eroded soil and water damage to the asphalt and clogged storm drain inlets. • Visually inspect the irrigation system, if installed. Look for signs of leaks, such as sagging areas in grass and/or pooling water. Look for dead spots in the grass which would indicate lack of water possibly caused by a mechanical failure.

Appendix C. Detailed List of Items for Passenger Facility Condition Assessment

Tables C-1 through C-10 present detailed lists of items for condition assessment at passenger facilities. The tables are organized by the eleven components described in the approach. In addition to the items, the tables include notes for inspection (where applicable) and units of measure.

This information in this appendix is also included in a separate spreadsheet.

Table C-1. Substructure

Category	Item	Notes	Unit of Measure
Foundations	Exposed Foundation Elements		inspect as each
	Other Structural Components		inspect as each
Basement	Slab		sq. ft.

Table C-2. Shell

Category	Item	Notes	Unit of Measure
Superstructure	Structural Frame	Columns, pillars, walls	inspect as each
Roof	Roof Waterproofing		inspect as each
	Roof Penetration Flashing Systems	Chimney, skylights, eaves, surroundings	inspect as each
	Roof Drainage Systems	Gutters	inspect as each
Exterior	Building Envelope - Masonry/Concrete Walls		sq. ft.
	Building Envelope - Cladding		sq. ft.
	Building Envelope - Windows and Glazing		sq. ft.
	Building Envelope - Doors, Glazing, Door Hardware		sq. ft.
	Building Envelope - Garage Doors		sq. ft.
	Bird Proofing System		inspect as each
	Exterior Finishes		inspect as each
Shell Appurtenances	Means of Egress	Stairs, fire escapes	inspect as each
	Vertical Openings		inspect as each
	Cat Walks		inspect as each
Building Expansion Joints	Building Expansion Joints		linear ft.

Table C-3. Interior

Category	Item	Notes	Unit of Measure
Partitions	Interior Walls		sq. ft.
	Interior Windows and Glazing		sq. ft.
	Interior Doors, Glazing, Door Hardware		sq. ft.
Stairs	Interior Stairs and Landings		units
Finishes	Flooring System		sq. ft.
	Ceiling System		sq. ft.
	Wall Finishes		sq. ft.
Other	Interior Amenities	Signage, built-in furnishings, appliances	inspect as each
	Built-In Seating		inspect as each

Table C-4. Plumbing

Category	Item	Notes	Unit of Measure
Domestic Water Distribution	Water Heaters		inspect as each
	Water Treatment Systems		inspect as each
	Backflow Prevention		inspect as each
Pumps	Pumps	Sump, well, domestic	inspect as each
Bathroom Fixtures	Bathroom Fixtures		inspect as each
Other Plumbing Items / Fixtures	Other Plumbing Fixtures	Piping, insulation, etc.	inspect as each

Table C-5. HVAC

Category	Item	Notes	Unit of Measure
HVAC	Energy Recovery Units		units
	Heat Pumps		units
	Make-Up Units		units
	Air Handling Units		units
	Boilers		units
	Burners		units
	Furnaces		units
	Unit Heaters		units
	Radiant Heaters		units
	Finned Tube Radiation and Convertors		units
	Air Conditioning Units	Split package, commercial through-the-wall, water-cooled package	units
	Splits and Mini-Splits		units
	Cooling Towers		units
	Condensers	Air-Cooled, evaporative	units
	Chillers		units
	HVAC Air Terminals		units
	Fans	Centrifugal, axial, roof-mounted, propeller	units
	Coils		units
	Heat Exchangers		units
	Reciprocating Compressors		units
	Air Curtains		units
	Water Treatment System		inspect as each
	Other HVAC Pumps (excluding heat pumps)		inspect as each
	Other HVAC Components	Piping, ductwork, etc.	inspect as each

Table C-6. Electrical

Category	Item	Notes	Unit of Measure
Electrical Service / Distribution	Power Distribution / Switchgear	Service entrance through subpanels	inspect as each
	Generator and Transfer Switch		inspect as each
	Transformers	Non-utility owned only	inspect as each
	DC Power Substation / Traction Power Substation		inspect as each
	AC Power Substation		inspect as each
	Service Panels		inspect as each
Backup Power	Uninterruptible Power Supply (UPS)		inspect as each
Lighting	Interior Lighting		inspect as each
	Exterior Lighting		inspect as each
Other Electrical	Other Electrical Components	Conduits, etc.	inspect as each
Lightning Protection System	Lightning Protection System		inspect as each

Table C-7. Fire Protection

Category	Item	Notes	Unit of Measure
Fire Protection	Fire Detection System		inspect as each
	Fire Suppression Systems	Sprinklers, standpipes, extinguishers, hydrants	inspect as each

Table C-8. Conveyance

Category	Item	Notes	Unit of Measure
Elevators	Elevators		units
Escalators	Escalators		units

Table C-9. Fare Collection

Category	Item	Notes	Unit of Measure
Fare Collection	Turnstiles		units
	Ticket Machines		units
	Other Fare Collection Items		inspect as each

Table C-10. Platform

Category	Item	Notes	Unit of Measure
Structure	Overlay		inspect as each
	Double Tee		inspect as each
	Joints		inspect as each
	Bearings		inspect as each
	Footing		inspect as each
	Rail Post Foundation		inspect as each
	Rail Post Connection		inspect as each
	Railing Connection		inspect as each
	Paint/Coatings		inspect as each
	Stairs/Ramps		inspect as each
	Other		inspect as each
Canopy (Deck)	Columns		inspect as each
	Structural Connections		inspect as each
	Roof Framing Elements		inspect as each
	Roof Decking		inspect as each
	Drainage System		inspect as each
	Skylights		inspect as each
	Electrical Connections		inspect as each
	Non-Electrical Connections		inspect as each
	Snow Guards		inspect as each
	Column Footings		inspect as each
Electrical	Emergency Lighting		inspect as each
	Platform Lighting		inspect as each
	Grounding		inspect as each
	PA System		inspect as each
	PIDS System		inspect as each
	VMS Signs		inspect as each

Table C-11. Site

Category	Item	Notes	Unit of Measure
Roads / Parking Lots / Sidewalk / Curbing	Access Road		sq. ft.
	Parking Lots		sq. ft.
	Sidewalks and Walkways		sq. ft.
	Pavement Markings		inspect as each
	Bollards and Handrails		inspect as each
Security	Fences		linear ft.
	Gates and Barrier Arms		inspect as each
	Camera / Surveillance System		inspect as each
	Guard Shack		inspect as each
Site Septic, Environmental, & Stormwater Management	Wastewater Management / Drainage		inspect as each
	Oil-Water Separator Tank		units
	Sanitary/Stormwater Pumping Systems		inspect as each
	Septic System Tank		units
	Septic System Leaching Fields or Cesspools		inspect as each
	Septic System Reserve Field		inspect as each

For each of the items listed in Tables C-1 through C-11, an inspector may consider the following questions shown in Table C-12.

These items were added following discussions with CTDOT and transit provider staff but are not directly applicable to the condition assessment ratings.

Using these questions could help an agency understand the importance of each asset while considering capital planning needs. The determination of safety critical, operations critical or the other fields could be initially made by the manager of the department in which the assets reside. The determination could then be reviewed and approved by Chief Operating Officer and Chief Financial Officer (who keeps the inventory).

An agency using these questions may want to establish further criteria for these items.

Table C-12. Yes/No Questions

Question	Description
Applicable?	Does the item exist at the facility / building? If it does, then answer Yes. If it does not, answer No.
Safety Critical?	A “Yes/No” question intended to highlight safety critical components.
Operations Critical?	A “Yes/No” question intended to highlight operations critical components.
Obsolete / Modernization?	A “Yes/No” question intended to highlight obsolete components.
Operating Savings Opportunity?	A “Yes/No” question intended to highlight operating savings opportunities.

Additional questions concerning the entire facility for an inspector to consider are listed below in Table C-13.

Table C-13. Additional Questions

Additional Questions
Is there adequate office space?
Is a break area provided?
Are male and female locker rooms and showers provided?
Is the facility ADA compliant?
Is the facility OSHA compliant?
Does a communications (data) system exist?
Does a phone system exist?

Appendix D. Detailed Rail Guideway Asset Hierarchy

CTDOT organizes transit assets according to an asset hierarchy. One of the four top-level categories of the hierarchy is fixed guideway, which is divided into rail and bus assets at the second level. The rail guideway hierarchy is further broken down in three additional levels, presented below in Table D-1. Note that this is an ideal hierarchy based on the approach being developed by MNR. CTDOT's working hierarchy, based on MNR's working hierarchy, is presented in Tables 8 and 9.

Table D-1. Detailed Rail Guideway Asset Hierarchy

Level 3	Level 4	Level 5
Track	Main	Block
		Control Point Track
		Grade Crossing
		Station
	Branch	Control Point Switch
		Yard
Power	Supply System Traction Power	Equipment
		Site
		Building
		Cable Plant
	Supply System Transmission Power	Equipment
		Site
		Building
		Cable Plant
	Traction Power Distribution	Test Equipment
		Negative Return System
		Catenary Equipment
		Cable Plant
	Signal Power System	Equipment
		Site
		Building
		Cable Plant
Structure	Undergrade Structure	Moveable Bridge
		Fixed Bridge

		Culvert
	Retaining Wall	Below Grade Retained Cut
		Elevated Retained Fill
	Overhead Structure	Catenary Portal Structure
		Miscellaneous Structure
		Overhead Bridge
Signals/Communications	Signaling	Block Signal System
		Interlocking
		Highway Rail Grade Crossing Network
	Train Detection Control	Train Fault Detection
		Yard Detection
	Communications/Monitoring	Communication Devices
		Fiber Optic System
		Aerial Communication Network
		Outside Cable Plant
		Passenger Communication System
	Security Systems	Integrated Electronic Security System
		Closed Circuit TV
		Fire Alarm System
		Access Control System
	Positive Train Control (Network)	Wayside Communication Network
		Back Office System
		Wayside Maintenance of Way System
		On-Board System

Appendix E. Capital Plan (FY 2022-2026)

2022-2026 Capital Plan - Transit

FFY 2022

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY22 Total Fed & State	Total Federal	Total State	FUNDING SOURCE	REGION
VARIOUS	ALL	VARIOUS	VARIOUS	Section 5310 Program - FFY 2022 (See Program of Projects)	4,836,895	4,836,895	4,836,895	0	5310	70
VARIOUS	ALL	VARIOUS	VARIOUS	Section 5311 Program - FFY 2022 (See Program of Projects)	4,342,935	4,342,935	4,342,935	0	5311	70
DOT01702384	AD	NA	VARIOUS	Transit Capital Planning	500,000	500,000	400,000	100,000	5307	70
DOT03000191PE	PE	NHL	VARIOUS	NHL - Station Improvement Program (Design)	4,000,000	4,000,000	0	4,000,000	STATE	78
DOT03040022PE	PE	NHL	VARIOUS	Waterbury Branch High Level Platform Design (Addl Derby)	2,000,000	2,000,000	0	2,000,000	STATE	78
DOT0304	PE	NHL	VARIOUS	Waterbury Branch-Waterbury Station Passenger Waiting Area Improve	1,000,000	1,000,000	0	1,000,000	STATE	78
DOT03000191CN	CN	NHL	VARIOUS	NHL - Station Improvement Program (SOGR projects)	5,000,000	5,000,000	0	5,000,000	STATE	78
DOT0301	PE	NHL	Stamford	NHL - Station Improvement Program- Stamford (Phase 2 Design)	2,000,000	2,000,000	0	2,000,000	STATE	1
DOT03000526CN	CN	NHL	South Norwalk	NHL - South Norwalk Station Platform Rehabilitation and Repair	2,600,000	2,600,000	0	2,600,000	STATE	1
DOT03010507CN	CN	NHL	Stamford	Stamford ITC Improvements - BUILD Grant Award (Addl to meet low bi	12,000,000	12,000,000	0	12,000,000	STATE	1
DOT03100072CN	CN	SLE	VARIOUS	SLE - Public Information Display Upgrades	5,000,000	5,000,000	0	5,000,000	STATE	13
DOT0300	CN	NHL	VARIOUS	S program/Timber Program (S-25)	7,000,000	7,000,000	0	7,000,000	STATE	78
DOT03000213CN	CN	NHL	VARIOUS	S program/Timber Program (S-24 Additional)	5,000,000	5,000,000	0	5,000,000	STATE	78
DOT03000175PE	PE	NHL	VARIOUS	Bridge Design	8,000,000	8,000,000	0	8,000,000	STATE	78
DOT0300	CN	NHL	VARIOUS	Bridge Replacement Program	10,000,000	10,000,000	0	10,000,000	STATE	78
DOT03010189PE	PE	NHL	VARIOUS	NHL Undergrade Bridges Norwalk - Addl Design (Strawberry Hill)	600,000	600,000	0	600,000	STATE	1
DOT03010524CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge - Adv Catenary/Track work	60,500,000	60,500,000	0	60,500,000	STATE	1
DOT0300	CN	NHL	VARIOUS	New Haven Line Track Program - Annual (Cyclical)	43,750,000	43,750,000	35,000,000	8,750,000	5307/5337	78
VARIOUS	CN	NHL	VARIOUS	Grade Crossing Renewal	6,200,000	6,200,000	0	6,200,000	STATE	78
DOT01705017PE	PE	Off System	Cromwell	ED - Wethersfield Secondary Track Washout - Cromwell	500,000	500,000	0	500,000	STATE	11/12
DOT01705017RW	RW	Off System	Cromwell	ED - Wethersfield Secondary Track Washout - Cromwell	100,000	100,000	0	100,000	STATE	11/12
DOT01705017CN	CN	Off System	Cromwell	ED - Wethersfield Secondary Track Washout - Cromwell	4,300,000	4,300,000	0	4,300,000	STATE	11/12
VARIOUS	CN	NHL	VARIOUS	Rail Maintenance Facilities SOGR	3,000,000	3,000,000	0	3,000,000	STATE	78
DOT03010520PE	PE	NHL	VARIOUS	New Haven Line Power Program (Phase 1)	6,000,000	6,000,000	0	6,000,000	STATE	78
DOT03010527CN	CN	NHL	VARIOUS	NHL - Powell Circuit Breaker Replacement and Refurbishment	6,400,000	6,400,000	0	6,400,000	STATE	78
DOT03010528CN	CN	NHL	VARIOUS	NHL - Motor Generator Set Replacement - Cos Cob and Fair St	600,000	600,000	0	600,000	STATE	78
DOT03010528CN	CN	NHL	VARIOUS	NHL - New Haven Cut Fence Repair -Substation - Howard Ave	1,000,000	1,000,000	0	1,000,000	STATE	8
DOT03010088PE	PE	NHL	New Haven	NHY - Design and Program Management	15,000,000	15,000,000	0	15,000,000	STATE	8
DOT0300	RS	ALL	VARIOUS	Rail Fleet (Locomotives / Coaches)	280,000,000	280,000,000	0	280,000,000	PA 15-1, Sec. 232-233	70
DOT03200022CN	CN	Hartford Line	Enfiled	Hartford Line - Enfield Station	30,000,000	30,000,000	0	30,000,000	PA 15-1, Sec. 232-233	8
DOT03200023CN	CN	Hartford Line	VARIOUS	Hartford Line-Windsor Locks Station (CSO Breakout) (Additional)	10,000,000	10,000,000	0	10,000,000	STATE	70
DOT03200016CN	CN	Hartford Line	VARIOUS	Hartford Line-Windsor Locks Station (FRA Grant / Additional)	37,190,000	37,190,000	17,190,000	20,000,000	FRA, PA 15-1, State	70
DOT0400	EQ	CT Transit	VARIOUS	CTTransit Misc Admin Captial/Facility Improvements FY22	3,750,000	3,750,000	3,000,000	750,000	5307	79
DOT01710464CN	CN	CTFastrak	VARIOUS	CTFastrak - V2X - Signal Upgrades	2,500,000	2,500,000	2,000,000	500,000	5307	70
VARIOUS	RS	CT Transit	VARIOUS	CT Transit Bus Replacements/Battery Electric Bus Program	75,000,000	75,000,000	60,000,000	15,000,000	5307	79
DOT0170	CN	VARIOUS	VARIOUS	Statewide Bus Shelter Enhancement Program	2,000,000	2,000,000	0	2,000,000	STATE	79
DOT0400	PE/CN	CT Transit	VARIOUS	CT Transit Facility Improvements/Electric Upgrades	5,000,000	5,000,000	0	5,000,000	STATE	79
DOT0403	CN	CT Transit	Waterbury	CT Transit Facility Waterbury Electric Upgrades/Electrific Bus Fleet (Lov	13,134,600	13,134,600	7,404,210	5,730,390	Low-No /State	79
DOT	PE	CT Transit	New Haven	CT Transit - Move NH Infrastructure Improvements - Design	2,000,000	2,000,000	0	2,000,000	STATE	8
DOT0430	RS	CTTransit	Waterbury	CTTransit/Wtbry - Replace Small Buses 2016 (12) FY 22	1,020,000	1,020,000	816,000	204,000	5307	5
DOT0426	RS	GHTD	Hartford	GHTD - Replace Paratransit Vehicles FY 22	2,300,000	2,300,000	1,840,000	460,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Union Station Rehab/Improvements FY 22	3,500,000	3,500,000	2,800,000	700,000	5307	10
DOT0426	EQ	GHTD	Hartford	GHTD - Admin Capital/Misc Support FY 22	1,500,000	1,500,000	1,200,000	300,000	5307	10
DOT0422	CN	MAT	Middletown	MAT Facility Improvements	500,000	500,000	400,000	100,000	5307	11/12
DOT0422	CN	MAT	Middletown	MAT New site/Surface parking/building rehab	5,000,000	5,000,000	0	5,000,000	STATE	11/12
DOT0422	EQ	MAT	Middletown	MAT - Admin Capital/Misc Support FY 22	300,000	300,000	240,000	60,000	5307	11/12
DOT0422	EQ	MAT	Middletown	MAT - Radio System FY 2022	575,000	575,000	0	575,000	STATE	11/12
DOT0427	RS	GNHTD	Hamden	GNHTD - Replace Paratransit Vehicles FY 22	1,800,000	1,800,000	1,440,000	360,000	5307	8
DOT0427	EQ	GNHTD	Hamden	GNHTD - Admin Capital/Misc Support FY 22	500,000	500,000	400,000	100,000	5307	8
DOT0410	EQ	GBTA	Bridgeport	GBTA Admin Capital/Misc Support FY 2022	680,000	680,000	544,000	136,000	5307	7
DOT0410	CN	GBTA	Bridgeport	GBTA - Bridgeport Intermodal Center Improvements FY 22	200,000	200,000	160,000	40,000	5307	7
DOT0410	EQ	GBTA	Bridgeport	GBTA - Radio System FY 2022	2,314,000	2,314,000	0	2,314,000	STATE	7
DOT0424	RS	MLFD TD	Milford	Milford TD - Paratransit Vehicles FY 2022	250,000	250,000	200,000	50,000	5307	8
DOT0424	CN	MLFD TD	Milford	Milford TD - Facility Improvements	75,000	75,000	60,000	15,000	5307	8
DOT0424	EQ	MLFD TD	Milford	Milford TD - Admin Capital/Misc Support FY 2022	400,000	400,000	320,000	80,000	5307	8
DOT0412	RS	NTD	Norwalk	Norwalk TD Replace 2010 Buses (1 30ft/2 35ft/1 40 ft)FY 22	2,250,000	2,250,000	1,800,000	450,000	5307	1
DOT0412	RS	NTD	Norwalk	Norwalk TD - Replace Paratransit Vehicles (10) FY 22	1,100,000	1,100,000	880,000	220,000	5307	1
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Admin Capital/Misc Support FY 2022	625,000	625,000	500,000	125,000	5307	1
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Radio System FY 2022	1,525,000	1,525,000	0	1,525,000	STATE	1
DOT0036	EQ	VTD	Waterbury	NVCOG/VTD - Admin Capital/Misc Support FY 2022	400,000	400,000	320,000	80,000	5307	5
DOT0416	RS	HART	Danbury	HART - Replace Paratransit Vehicles FY 22	500,000	500,000	400,000	100,000	5307	2
DOT0416	EQ	HART	Danbury	HART - Admin Capital/Misc Support FY 22	200,000	200,000	160,000	40,000	5307	2

2022-2026 Capital Plan - Transit

FFY 2022

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY22 Total Fed & State	Total Federal	Total State	FUNDING SOURCE	REGION
DOT0416	OP	HART	Danbury	HART - Operating Assitance FY 22	615,302	615,302	615,302	0	5307	2
DOT0416	CN	HART	Danbury	HART - Facility Rehab/Improvements FY 22	1,500,000	1,500,000	1,200,000	300,000	5307	2
DOT0416	EQ	HART	Danbury	HART - Radio System FY 2022	600,000	600,000	0	600,000	STATE	2
DOT0414	CN	SEAT	Norwich	SEAT - New Admin/Maint Facility - Design FY 22	1,000,000	1,000,000	800,000	200,000	5307	13
DOT0414	EQ	SEAT	Norwich	SEAT - Admin Capital/Misc Support FY 22	725,000	725,000	580,000	145,000	5307	13
DOT	RW	NWTD	Torrington	NWTD - New Facility Site	1,800,000	1,800,000	0	1,800,000	STATE	3
DOT0478	RS	Esutary TD	Centerbrook	Estuary TD - Replace Small Buses FY 2022	300,000	300,000	240,000	60,000	5307	11/12
DOT0478	EQ	Esutary TD	Centerbrook	Estuary TD - Admin Capital/Misc Support FY 2022	70,000	70,000	56,000	14,000	5307	11/12
DOT0478	EQ	Esutary TD	Centerbrook	Estuary TD - Radio System FY 2022	450,000	450,000	0	450000	STATE	11/12
DOT04740095CN	CN	Windham TD	Windham	Windham TD Facility Improvements	4,000,000	4,000,000	0	4000000	STATE	13
DOT047740073EQ	EQ	Windham TD	Windham	Windham TD - Radio System FY 2022	750,000	750,000	0	750000	STATE	13
DOT	ALL	VARIOUS	VARIOUS	Discretionary NOFO Match Requirements	15,000,000	15,000,000	0	15000000	STATE	70
DOT01703438EQ	EQ	VARIOUS	VARIOUS	Transit District Match Requirements	7,000,000	7,000,000	0	7000000	STATE	70
VARIOUS	CN	VARIOUS	VARIOUS	Transit District Facility Upgrades for Battery Electric Buses	12,500,000	12,500,000	10,000,000	2,500,000	5307	70

Updated 6/20/22

2022-2026 Capital Plan - Transit

FFY 2023

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY23 Total Fed & State	Total Federal	Total State	FUNDING SOURCE	REGION
VARIOUS		VARIOUS	VARIOUS	Section 5310 Program - FFY 2023 (See Program of Projects)	4,909,448	4,909,448	4,909,448	0	5310	70
VARIOUS		VARIOUS	VARIOUS	Section 5311 Program - FFY 2023 (See Program of Projects)	4,408,079	4,408,079	4,408,079	0	5311	70
DOT01702384	AD	NA	VARIOUS	Transit Capital Planning	500,000	500,000	400,000	100,000	5307	70
DOT03000191PE	PE	NHL	VARIOUS	NHL - Station Improvement Program (Design)	5,000,000	5,000,000	0	5,000,000	STATE	78
DOT0301	CN	NHL	Fairfield	NHL - Station Improvement Program	20,000,000	20,000,000	16,000,000	4,000,000	5307/5337	78
DOT0304	CN	NHL	VARIOUS	Naugatuck Station	25,000,000	25,000,000	20,000,000	5,000,000	5307/5337	78
DOT03000199CN	NHL	NHL	VARIOUS	NHL - Customer Service Initiative	10,000,000	10,000,000	0	10,000,000	STATE	78
DOT0300	CN	NHL	VARIOUS	S program/Timber Program	6,000,000	6,000,000	0	6,000,000	STATE	78
DOT03000175PE	PE	NHL	VARIOUS	Bridge Design	6,500,000	6,500,000	0	6,500,000	STATE	78
DOT0300	CN	NHL	VARIOUS	Bridge Replacement Program	11,500,000	11,500,000	0	11,500,000	STATE	78
DOT0301	CN	NHL	Milford	NHL - Indian River Bridge - Milford	10,000,000	10,000,000	8,000,000	2,000,000	5307/5337	8
DOT03010176CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge	160,000,000	160,000,000	26,000,000	134,000,000	5307/5337	1
DOT03010176CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge	186,240,440	186,240,440	109,600,000	76,640,440	FRA/STATE	78
DOT03010187CN	CN	NHL	Norwalk	Replacement-East Ave Bridge, Norwalk/East Norwalk Station	60,000,000	60,000,000	48,000,000	12,000,000	5307/5337	1
DOT03010188CN	CN	NHL	Norwalk	Bridge Replacement Program-Osborne Ave Bridge,Norwalk	15,000,000	15,000,000	12,000,000	3,000,000	5307/5337	1
DOT03010189CN	CN	NHL	Norwalk	Bridge Replacement Program-Fort Point St Bridge,Norwalk	50,000,000	50,000,000	40,000,000	10,000,000	5307/5337	1
DOT03010529CN	CN	NHL	Norwalk	Bridge Replacement Program-Strawberry Hill Ave Bridge,Norwalk	6,250,000	6,250,000	5,000,000	1,250,000	5307/5337	1
DOT03010168	PE	NHL	Milford/Stratford	NHL-Devon Movable Bridge (Additional PE)	15,000,000	15,000,000	12,000,000	3,000,000	5307/5337	7
DOT0300	CN	NHL	VARIOUS	New Haven Line Track Program - Annual (Cyclical)	25,000,000	25,000,000	20,000,000	5,000,000	5307/5337	78
DOT0300	CN	NHL	VARIOUS	Rail Maintenance Facilities SOGR	3,500,000	3,500,000	0	3,500,000	STATE	78
DOT03010192CN	CN	NHL	Stamford	Stamford Yard Catenary Leads and Car Wash Facility	50,000,000	50,000,000	40,000,000	10,000,000	5307/5337	1
DOT03010520PE	PE	NHL	VARIOUS	New Haven Line Power Program (Phase 2)	3,000,000	3,000,000	0	3,000,000	STATE	78
DOT03010146CN	CN	NHL	New Haven	NHRY - Wheel Mill Upgrade	31,250,000	31,250,000	25,000,000	6,250,000	5307/5337	8
DOT03010130CN	CN	NHL	New Haven	NH Rail Yard - Master Complex (Car & Diesel Shop)	75,000,000	75,000,000	60,000,000	15,000,000	5307/5337	8
DOT03010088PE	PE	NHL	New Haven	NHY - Design and Program Management	10,000,000	10,000,000	0	10,000,000	STATE	8
DOT0170	PE	ALL	VARIOUS	Transit Intermodal Fare Technology Upgrades - Design	3,000,000	3,000,000	0	3,000,000	STATE	70
DOT0170	PE	ALL	VARIOUS	EV Charging Stations Program	5,000,000	5,000,000	0	5,000,000	STATE	70
DOT0400	EQ	CT Transit	VARIOUS	CTTransit - Misc Admin Capital/Fac Improvements FY 23	1,000,000	1,000,000	800,000	200,000	5307	79
DOT0170	CN	VARIOUS	VARIOUS	Statewide Bus Shelter Enhancement Program	6,000,000	6,000,000	4,800,000	1,200,000	5307	79
DOT0403	CN	CT Transit	Waterbury	CT Transit Facility Waterbury - Improvements	2,500,000	2,500,000	0	2,500,000	STATE	5
DOT0430	RS	CTTransit	Waterbury	CTTransit/Wtbry - Replace Small Buses 2017 (10) FY 23	850,000	850,000	680,000	170,000	5307	5
DOT	PE	CT Transit	New Haven	CT Transit - Move NH Infrastructure Improvements - Design	12,000,000	12,000,000	9,600,000	2,400,000	5307	8
DOT0426	RS	GHTD	Hartford	GHTD - Replace Paratransit Vehicles FY 23	3,000,000	3,000,000	2,400,000	600,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Union Station Rehab/Improvements FY 23	2,000,000	2,000,000	1,600,000	400,000	5307	10
DOT0426	EQ	GHTD	Hartford	GHTD - Admin Capital/Misc Support FY 23	1,500,000	1,500,000	1,200,000	300,000	5307	10
DOT0422	EQ	MAT	Middletown	MAT - Admin Capital/Misc Support FY 22	300,000	300,000	240,000	60,000	5307	11/12
DOT0427	RS	GNHTD	Hamden	GNHTD - Replace Paratransit Vehicles FY 23	1,500,000	1,500,000	1,200,000	300,000	5307	8
DOT0427	EQ	GNHTD	Hamden	GNHTD - Admin Capital/Misc Support FY 23	500,000	500,000	400,000	100,000	5307	8
DOT0427	CN	GNHTD	Hamden	GNHTD - New Facility FY 21(Moved to 2023)	32,500,000	32,500,000	26,000,000	6,500,000	5307	8
DOT0410	RS	GBTA	Bridgeport	GBTA Replace Buses (Replace 17 2011& 2012)	13,750,000	13,750,000	11,000,000	2,750,000	5307	7
DOT0410	RS	GBTA	Bridgeport	GBTA Paratransit Vehicles FY 2023	605,000	605,000	484,000	121,000	5307	7
DOT0410	EQ	GBTA	Bridgeport	GBTA Admin Capital/Misc Support FY 2023	435,000	435,000	348,000	87,000	5307	7
DOT0424	CN	MLFD TD	Milford	Milford TD - Facility Improvements	75,000	75,000	60,000	15,000	5307	8
DOT0424	EQ	MLFD TD	Milford	Milford TD - Admin Capital/Misc Support FY 2023	400,000	400,000	320,000	80,000	5307	8
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Admin Capital/Misc Support FY 23	625,000	625,000	500,000	125,000	5307	1
DOT0036	RS	VTD	Waterbury	NVCOG/VTD - Replace Small Busess FY 2023	1,250,000	1,250,000	1,000,000	250,000	5307	5
DOT0036	EQ	VTD	Waterbury	NVCOG/VTD - Admin Capital/Misc Support FY 2023	400,000	400,000	320,000	80,000	5307	5
DOT0416	EQ	HART	Danbury	HART Admin Capital/Misc Support	200,000	200,000	160,000	40,000	5307	2
DOT0416	EQ	HART	Danbury	HART - Midlife Engine Rebuild 2017 Giligs	260,000	260,000	208,000	52,000	5307	2
DOT0416	CN	HART	Danbury	HART - Pulse Point Rehab FY 23	800,000	800,000	640,000	160,000	5307	2
DOT0416	OP	HART	Danbury	HART Operating Assitance	615,302	615,302	615,302	0	5307	2
DOT0414	EQ	SEAT	Norwich	SEAT - Admin Capital/Misc Support FY 23	450,000	450,000	360,000	90,000	5307	13
DOT0478	EQ	Esutary TD	Centerbrook	Estuary TD - Admin Capital/Misc Support FY 2023	56,000	56,000	44,800	11,200	5307	11/12
DOT	ALL	VARIOUS	VARIOUS	Discretionary NOFO Match Requirements	6,000,000	6,000,000	0	6,000,000	STATE	70
DOT01703438EQ	EQ	VARIOUS	VARIOUS	Transit District Match Requirements	7,000,000	7,000,000	0	7,000,000	STATE	70
DOT03010114CN	CN	NHL	New Haven	New Haven Union Station Improvements /Parking	65,000,000	65,000,000	0	65,000,000	PA 15-1, Sec. 232-233	8
VARIOUS	CN	VARIOUS	VARIOUS	Transit District Facility Upgrades for Battery Electric Buses	5,000,000	5,000,000	4,000,000	1,000,000	5307	70

2022-2026 Capital Plan - Transit

FFY 2024

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY24 Total Fed & State	Total Federal	Total State	FUNDING SOUIRCE	REGION
VARIOUS		VARIOUS	VARIOUS	Section 5310 Program - FFY 2024 (See Program of Projects)	4,983,090	4,983,090	4,983,090	0	5310	70
VARIOUS		VARIOUS	VARIOUS	Section 5311 Program - FFY 2024 (See Program of Projects)	4,474,200	4,474,200	4,474,200	0	5311	70
DOT01702384	AD	NA	VARIOUS	Transit Capital Planning	500,000	500,000	400,000	100,000	5307	70
DOT03000191PE	PE	NHL	VARIOUS	NHL - Station Improvement Program (Design)	5,000,000	5,000,000	0	5,000,000	STATE	78
DOT0304	CN	NHL	VARIOUS	Waterbury Branch-Waterbury Station Passenger Waiting Area Improve	5,000,000	5,000,000	0	5,000,000	STATE	78
DOT0304	CN	NHL	VARIOUS	Waterbury Branch High Level Platform Construction	80,000,000	80,000,000	64,000,000	16,000,000	5307/5337	78
DOT0300	CN	NHL	VARIOUS	S program/Timber Program	7,000,000	7,000,000	0	7,000,000	STATE	78
DOT03000175PE	PE	NHL	VARIOUS	Bridge Design	6,500,000	6,500,000	0	6,500,000	STATE	78
DOT0300	CN	NHL	VARIOUS	Bridge Replacement Program	20,000,000	20,000,000	0	20,000,000	STATE	78
DOT03010176CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge	168,750,000	168,750,000	15,000,000	153,750,000	5307/5337	1
DOT0300	CN	NHL	VARIOUS	New Haven Line Track Program - Annual (Cyclical)	11,875,000	11,875,000	9,500,000	2,375,000	5307/5337	78
DOT0300	CN	NHL	VARIOUS	Rail Maintenance Facilities SOGR	6,500,000	6,500,000	0	6,500,000	STATE	78
DOT03010154	CN	NHL	VARIOUS	NHL - Signal System Replacement Phase 4 Continued	25,000,000	25,000,000	20,000,000	5,000,000	5307/5337	77
DOT03010520CN	CN	NHL	VARIOUS	New Haven Line Power Program (Phase 1)	35,000,000	35,000,000	28,000,000	7,000,000	5307/5337	78
DOT03010520PE	PE	NHL	VARIOUS	New Haven Line Power Program (Phase 3)	2,000,000	2,000,000	0	2,000,000	STATE	78
DOT03000215CN	CN	NHL	VARIOUS	Network Infrastructure Upgrade Phase 4 CN (FDP 1/31/2024)	30,000,000	30,000,000	24,000,000	6,000,000	5307/5337	78
DOT0300	CN	NHL	Stamford	Stamford MOE Building - State of Good Repair	62,500,000	62,500,000	50,000,000	12,500,000	5307/5337	1
DOT03010192CN	CN	NHL	Stamford	Stamford Yard Catenary Leads and Car Wash Facility	50,000,000	50,000,000	40,000,000	10,000,000	5307/5337	1
DOT03020028CN	CN	NHL	Danbury	Danbury Fueling Facility	6,250,000	6,250,000	5,000,000	1,250,000	5307/5337	2
DOT0301	CN	NHL	New Haven	NHY-Master Complex	5,000,000	5,000,000	4,000,000	1,000,000	5307/5337	8
DOT03010088PE	PE	NHL	New Haven	NHY - Design and Program Management	10,000,000	10,000,000	0	10,000,000	STATE	8
DOT03200008	CN	Hartford Line	West Hartford	Hartford Line Double Track - Contract 1 (West Hartford)	62,000,000	62,000,000	0	62,000,000	PA 15-1, Sec. 232-233	10
DOT03200008	CN	Hartford Line	Windsor Locks	Hartford Line Double Track - Contract 2 (Windsor Locks)	62,000,000	62,000,000	0	62,000,000	PA 15-1, Sec. 232-233	10
DOT03200008	CN	Hartford Line	Enfield	Hartford Line Double Track - Contract 3 (Enfield)	62,000,000	62,000,000	0	62,000,000	PA 15-1, Sec. 232-233	10
DOT0400	EQ	CT Transit	VARIOUS	CTTransit - Misc Admin Capital/ Fac Improvements FY 24	1,200,000	1,200,000	800,000	400,000	5307	79
DOT0400	RS	CT Transit	VARIOUS	CT Transit Bus Replacements/Battery Electric Bus Program	21,250,000	21,250,000	17,000,000	4,250,000	5307	79
DOT0170	CN	VARIOUS	VARIOUS	Statewide Bus Shelter Enhancement Program	6,250,000	6,250,000	5,000,000	1,250,000	5307	79
DOT0400	CN	CT Transit	VARIOUS	CT Transit Facility Improvements (Hartford/Stamford)	48,450,000	48,450,000	39,700,000	8,750,000	5307/5339	79
DOT0430	RS	CTTransit	Waterbury	CTTransit/Wtbry - Replace Small Buses 2017 BEB (10) FY 24	850,000	850,000	680,000	170,000	5307	5
DOT0402	CN	CT Transit	VARIOUS	CT Transit - Move NH Infrastructure Improvements	80,000,000	80,000,000	64,000,000	16,000,000	5307	8
DOT0426	RS	GHTD	Hartford	GHTD - Replace Paratransit Vehicles FY 24	3,000,000	3,000,000	2,400,000	600,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Union Station Rehab/Improvements FY 24	1,000,000	1,000,000	800,000	200,000	5307	10
DOT0426	EQ	GHTD	Hartford	GHTD - Admin Capital/Misc Support FY 24	750,000	750,000	600,000	150,000	5307	10
DOT0422	RS	MAT	Middletown	MAT - Replace 3 2012 30ft Buses FY 24	1,875,000	1,875,000	1,500,000	375,000	5307	11/12
DOT0422	CN	MAT	Middletown	MAT Facility Improvements FY 24	500,000	500,000	400,000	100,000	5307	11/12
DOT0422	EQ	MAT	Middletown	MAT - Admin Capital/Misc Support FY 24	300,000	300,000	240,000	60,000	5307	11/12
DOT0427	RS	GNHTD	Hamden	GNHTD - Replace Paratransit Vehicles FY 24	1,800,000	1,800,000	1,440,000	360,000	5307	8
DOT0427	EQ	GNHTD	Hamden	GNHTD - Admin Capital/Misc Support FY 24	500,000	500,000	400,000	100,000	5307	8
DOT0410	EQ	GBTA	Bridgeport	GBTA Admin Capital/Misc Support FY 24	575,000	575,000	460,000	115,000	5307	7
DOT0410	CN	GBTA	Bridgeport	GBTA - Bridgeport Intermodal Center Improvements FY 24	200,000	200,000	160,000	40,000	5307	7
DOT0424	CN	MLFD TD	Milford	Milford TD - Facility Improvements FY 24	120,000	120,000	80,000	40,000	5307	8
DOT0424	EQ	MLFD TD	Milford	Milford TD - Admin Capital/Misc Support FY 24	400,000	400,000	320,000	80,000	5307	8
DOT0412	RS	NTD	Norwalk	Norwalk TD - Paratransit Vehicles FY 24	1,250,000	1,250,000	1,000,000	250,000	5307	1
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Admin Capital/Misc Support FY 24	625,000	625,000	500,000	125,000	5307	1
DOT0412	CN	NTD	Norwalk	Norwalk TD - Facility SOGR	900,000	900,000	600,000	300,000	5307	1
DOT00360199EQ	EQ	VTD	Waterbury	NVCOG/VTD - Admin Capital/Misc Support FY 24	400,000	400,000	320,000	80,000	5307	5
DOT0416	RS	HART	Danbury	HART -Paratransit Vehicles FY 24	800,000	800,000	640,000	160,000	5307	2
DOT0416	EQ	HART	Danbury	HART Admin Capital/Misc Support FY 24	200,000	200,000	160,000	40,000	5307	2
DOT0416	CN	HART	Danbury	HART - Facility Replace Fuel Storage Tanks FY 24	1,000,000	1,000,000	800,000	200,000	5307	2
DOT0416	OP	HART	Danbury	HART Operating Assitance FY 24	615,302	615,302	615,302	0	5307	2
DOT0414	RS	SEAT	Norwich	SEAT Paratransit Vehicles FY 24	375,000	375,000	300,000	75,000	5307	13
DOT0414	EQ	SEAT	Norwich	SEAT - Admin Capital/Misc Support FY 24	300,000	300,000	240,000	60,000	5307	13
DOT	CN	NWTD	Torrington	NWTD - New Facility Site	5,000,000	5,000,000	0	5,000,000	STATE	3
DOT0478	CN	Esutary TD	Centerbrook	Estuary TD - New Facility (moved to 2024)	25,000,000	25,000,000	20,000,000	5,000,000	5307	11/12
DOT0478	EQ	Esutary TD	Centerbrook	Estuary TD - Admin Capital/Misc Support FY 24	400,000	400,000	320,000	80,000	5307	11/12
DOT	ALL	VARIOUS	VARIOUS	Discretionary NOFO Match Requirements	6,000,000	6,000,000	0	6,000,000	STATE	70
DOT01703438EQ	EQ	VARIOUS	VARIOUS	Transit District Match Requirements	7,000,000	7,000,000	0	7,000,000	STATE	70
VARIOUS	CN	VARIOUS	VARIOUS	Transit District Facility Upgrades for Battery Electric Buses	5,000,000	5,000,000	4,000,000	1,000,000	5307	70

2022-2026 Capital Plan - Transit

FFY 2025

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY25 Total Fed & State	Total Federal	Total State	FUNDING SOURCE	REGION
VARIOUS		VARIOUS	VARIOUS	Section 5310 Program - FFY 2025 (See Program of Projects)	5,057,837	5,057,837	5,057,837	0	5310	70
VARIOUS		VARIOUS	VARIOUS	Section 5311 Program - FFY 2025 (See Program of Projects)	4,541,314	4,541,314	4,541,314	0	5311	70
DOT01702384	AD	NA	VARIOUS	Transit Capital Planning	500,000	500,000	400,000	100,000	5307	70
DOT03000191PE	PE	NHL	VARIOUS	NHL - Station Improvement Program (Design)	6,000,000	6,000,000	0	6,000,000	STATE	78
DOT03010522PE	CN	NHL	New Haven	NHL - New Haven Union Station Platform Replacement	117,500,000	117,500,000	70,000,000	47,500,000	5307/5337	8
DOT0304	CN	NHL	Derby/Shelton	NHL - Derby Shelton Intermodal (FFY 2021 RAISE Grant)	25,000,000	25,000,000	12,400,000	12,600,000	RAISE/STATE	7
DOT0300	CN	NHL	VARIOUS	S program/Timber Program	7,000,000	7,000,000	0	7,000,000	STATE	78
DOT03000175PE	PE	NHL	VARIOUS	Bridge Design	6,000,000	6,000,000	0	6,000,000	STATE	78
DOT0300	CN	NHL	VARIOUS	Bridge Replacement Program	10,000,000	10,000,000	0	10,000,000	STATE	78
DOT03010176CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge	110,000,000	110,000,000	24,000,000	86,000,000	5307/5337	1
DOT03000214CN	CN	NHL	Bridgeport	NHL-TIME Phase 1(5 Bridges- West Broad, King, Main, Bruce, Bishop)	70,000,000	70,000,000	20,000,000	50,000,000	5307/5337	78
DOT0300	CN	NHL	VARIOUS	New Haven Line Track Program - Annual (Cyclical)	21,250,000	21,250,000	17,000,000	4,250,000	5307/5337	78
DOT03030011	CN	NHL	NewCanaan	New Canaan Branch Siding	40,000,000	40,000,000	32,000,000	8,000,000	5307/5337	
DOT0300	PE	NHL	VARIOUS	Rail Maintenance Facilities SOGR	5,500,000	5,500,000	0	5,500,000	STATE	78
DOT03010154	EQ	NHL	VARIOUS	NHL - Catenary System - State of Good Repair	30,000,000	30,000,000	0	30,000,000	STATE	77
DOT03010520CN	CN	NHL	VARIOUS	New Haven Line Power Program (Phase 2)	30,000,000	30,000,000	24,000,000	6,000,000	5307/5337	78
DOT03010520PE	PE	NHL	VARIOUS	New Haven Line Power Program (Phase 4)	3,000,000	3,000,000	0	3,000,000	STATE	78
DOT0301	CN	NHL	New Haven	NHY-Master Complex	20,000,000	20,000,000	0	20,000,000	STATE	8
DOT03010088PE	CN	NHL	New Haven	NHY - Design and Program Management	5,000,000	5,000,000	0	5,000,000	STATE	8
DOT0170	AQ	ALL	VARIOUS	Transit Intermodal Fare Technology Upgrades - Implementation	15,000,000	15,000,000	0	15,000,000	STATE	70
DOT0400	CN	CT Transit	VARIOUS	CTTransit - Misc Admin Capital/ Fac Improvements FY 25	1,000,000	1,000,000	800,000	200,000	5307	79
DOT0400	RS	CT Transit	VARIOUS	CT Transit Bus Replacements/Battery Electric Bus Program	5,000,000	5,000,000	4,000,000	1,000,000	5307	79
DOT0170	RS	VARIOUS	VARIOUS	Statewide Bus Shelter Enhancement Program	1,500,000	1,500,000	1,200,000	300,000	5307	79
DOT0400	CN	CT Transit	VARIOUS	CT Transit Facility Improvements (Hartford/Stamford)	42,100,000	42,100,000	34,600,000	7,500,000	5307/5339	79
DOT0426	EQ	GHTD	Hartford	GHTD - Replace Paratransit Vehicles FY 25	3,000,000	3,000,000	2,400,000	600,000	5307	10
DOT0426	RS	GHTD	Hartford	GHTD - Union Station Rehab/Improvements FY 25	1,000,000	1,000,000	800,000	200,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Admin Capital/Misc Support FY 25	750,000	750,000	600,000	150,000	5307	10
DOT0422	EQ	MAT	Middletown	MAT Facility Improvements FY 25	500,000	500,000	400,000	100,000	5307	11/12
DOT0422	RS	MAT	Middletown	MAT - Admin Capital/Misc Support FY 25	300,000	300,000	240,000	60,000	5307	11/12
DOT0427	EQ	GNHTD	Hamden	GNHTD - Replace Paratransit Vehicles FY 25	1,750,000	1,750,000	1,400,000	350,000	5307	8
DOT0427	RS	GNHTD	Hamden	GNHTD - Admin Capital/Misc Support FY 25	500,000	500,000	400,000	100,000	5307	8
DOT0410	RS	GBTA	Bridgeport	GBTA Admin Capital/Misc Support FY 25	575,000	575,000	460,000	115,000	5307	7
DOT0410	EQ	GBTA	Bridgeport	GBTA - Bridgeport Intermodal Center Improvements FY 25	200,000	200,000	160,000	40,000	5307	7
DOT0424	CN	MLFD TD	Milford	Milford TD - Paratransit Vehicles FY 25	375,000	375,000	300,000	75,000	5307	8
DOT0424	RS	MLFD TD	Milford	Milford TD - Facility Improvements FY 25	100,000	100,000	80,000	20,000	5307	8
DOT0424	CN	MLFD TD	Milford	Milford TD - Admin Capital/Misc Support FY 25	400,000	400,000	320,000	80,000	5307	8
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Paratransit Vehicles FY 25	1,000,000	1,000,000	800,000	200,000	5307	1
DOT0412	RS	NTD	Norwalk	Norwalk TD - Admin Capital/Misc Support FY 25	500,000	500,000	400,000	100,000	5307	1
DOT00360199EQ	EQ	VTD	Waterbury	NVCOG/VTD - Admin Capital/Misc Support FY 25	400,000	400,000	320,000	80,000	5307	5
DOT0416	CN	HART	Danbury	HART -Paratransit Vehicles FY 25	750,000	750,000	600,000	150,000	5307	2
DOT0416	EQ	HART	Danbury	HART Admin Capital/Misc Support FY 25	200,000	200,000	160,000	40,000	5307	2
DOT0416	RS	HART	Danbury	HART Operating Assitance FY 25	615,302	615,302	615,302	0	5307	2
DOT0414	EQ	SEAT	Norwich	SEAT Paratransit Vehicles FY 25	375,000	375,000	300,000	75,000	5307	13
DOT0414	CN	SEAT	Norwich	SEAT - Admin Capital/Misc Support FY 25	300,000	300,000	240,000	60,000	5307	13
DOT0478	OP	Esutary TD	Centerbrook	Estuary TD - Admin Capital/Misc Support FY 25	400,000	400,000	320,000	80,000	5307	11/12
DOT	ALL	VARIOUS	VARIOUS	Discretionary NOFO Match Requirements	6,000,000	6,000,000	0	6,000,000	STATE	70
DOT01703438EQ	EQ	VARIOUS	VARIOUS	Transit District Match Requirements	7,000,000	7,000,000	0	7,000,000	STATE	70
VARIOUS	RS	VARIOUS	VARIOUS	Transit District Bus Replacements	6,250,000	6,250,000	5,000,000	1,250,000	5307	70
VARIOUS	CN	VARIOUS	VARIOUS	Transit District Facility Upgrades for Battery Electric Buses	5,000,000	5,000,000	4,000,000	1,000,000	5307	70

2022-2026 Capital Plan - Transit

FFY 2026

PROJECT	PHASE	ROUTE	TOWN	DESCRIPTION	TOTAL PROJECT COST	FFY26 Total Fed & State	Total Federal	Total State	FUNDING SOURCE	REGION
VARIOUS		VARIOUS	VARIOUS	Section 5310 Program - FFY 2026(See Program of Projects)	5,133,704	5,133,704	5,133,704	0	5310	70
VARIOUS		VARIOUS	VARIOUS	Section 5311 Program - FFY 2026(See Program of Projects)	4,609,433	4,609,433	4,609,433	0	5311	70
DOT01702384	AD	NA	VARIOUS	Transit Capital Planning	450,000	450,000	360,000	90,000	5307	70
DOT03000191PE	PE	NHL	VARIOUS	NHL - Station Improvement Program (Design)	5,500,000	5,500,000	0	5,500,000	STATE	78
DOT03010522CN	CN	NHL	New Haven	NHL - New Haven Union Station Platform Replacement	81,250,000	81,250,000	45,000,000	36,250,000	5307/5337	8
DOT0300	CN	NHL	VARIOUS	S program/Timber Program	7,000,000	7,000,000	0	7,000,000	STATE	78
DOT03000175PE	PE	NHL	VARIOUS	Bridge Design	6,500,000	6,500,000	0	6,500,000	STATE	78
DOT0300	CN	NHL	VARIOUS	Bridge Replacement Program	10,000,000	10,000,000	0	10,000,000	STATE	78
DOT03000196CN	CN	NHL	VARIOUS	Scour Rehabilitation 4 NHL Bridges	8,125,000	8,125,000	6,500,000	1,625,000	5307/5337	78
DOT00820317CN	CN	Off-System	Middletown	Middletown Swing Bridge - SOGR	25,000,000	25,000,000	0	25,000,000	STATE	11/12
DOT03010176CN	CN	NHL	Norwalk	NHL - WALK Moveable Bridge	110,000,000	110,000,000	24,000,000	86,000,000	5307/5337	1
DOT03000214CN	CN	NHL	Bridgeport	NHL-TIME Phase 1(5 Bridges- West Broad, King, Main, Bruce, Bishop)	117,500,000	117,500,000	78,000,000	39,500,000	5307/5337	8
DOT0300	CN	NHL	VARIOUS	New Haven Line Track Program	15,625,000	15,625,000	12,500,000	3,125,000	5307/5337	78
DOT03020023CN	CN	NHL	VARIOUS	Danbury Branch - Slope and Track Stablilization (FDP 1/15/2025)	12,500,000	12,500,000	10,000,000	2,500,000	5307/5337	1
DOT0300	CN	NHL	VARIOUS	Rail Maintenance Facilities SOGR	3,000,000	3,000,000	0	3,000,000	STATE	78
DOT03010154	CN	NHL	VARIOUS	NHL - Catenary System - State of Good Repair	20,000,000	20,000,000	0	20,000,000	STATE	77
DOT03010520CN	PE	NHL	VARIOUS	New Haven Line Power Program (Phase 3)	15,000,000	15,000,000	12,000,000	3,000,000	5307/5337	78
DOT0301	EQ	NHL	New Haven	NHY - Master Complex	40,000,000	40,000,000	0	40,000,000	STATE	8
DOT03010088PE	CN	NHL	New Haven	NHY - Design and Program Management	10,000,000	10,000,000	0	10,000,000	STATE	8
DOT0400	PE	CT Transit	VARIOUS	CTTransit - Misc Admin Capital/ Fac Improvements FY 26	1,000,000	1,000,000	800,000	200,000	5307	79
DOT0400	RS	CT Transit	VARIOUS	CT Transit Bus Replacements/Battery Electric Bus Program	5,875,000	5,875,000	4,700,000	1,175,000	5307	79
DOT0170	CN	VARIOUS	VARIOUS	Statewide Bus Shelter Enhancement Program	1,500,000	1,500,000	1,200,000	300,000	5307	79
DOT0400	CN	CT Transit	VARIOUS	CT Transit Facility Improvements (Hartford/Stamford/NH)	6,250,000	6,250,000	5,000,000	1,250,000	5307/5339	79
DOT0426	CN	GHTD	Hartford	GHTD - Replace Paratransit Vehicles FY 26	3,000,000	3,000,000	2,400,000	600,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Union Station Rehab/Improvements FY 26	1,000,000	1,000,000	800,000	200,000	5307	10
DOT0426	CN	GHTD	Hartford	GHTD - Admin Capital/Misc Support FY 26	750,000	750,000	600,000	150,000	5307	10
DOT0422	RS	MAT	Middletown	MAT Facility Improvements FY 26	500,000	500,000	400,000	100,000	5307	11/12
DOT0422	RS	MAT	Middletown	MAT - Admin Capital/Misc Support FY 26	300,000	300,000	240,000	60,000	5307	11/12
DOT0427	CN	GNHTD	Hamden	GNHTD - Replace Paratransit Vehicles FY 26	1,800,000	1,800,000	1,440,000	360,000	5307	8
DOT0427	CN	GNHTD	Hamden	GNHTD - Admin Capital/Misc Support FY 26	500,000	500,000	400,000	100,000	5307	8
DOT0410	EQ	GBTA	Bridgeport	GBTA Admin Capital/Misc Support FY 26	575,000	575,000	460,000	115,000	5307	7
DOT0410	RS	GBTA	Bridgeport	GBTA - Bridgeport Intermodal Center Improvements FY 26	200,000	200,000	160,000	40,000	5307	7
DOT0424	CN	MLFD TD	Milford	Milford TD - Paratransit Vehicles FY 26	375,000	375,000	300,000	75,000	5307	8
DOT0424	EQ	MLFD TD	Milford	Milford TD - Facility Improvements FY 26	100,000	100,000	80,000	20,000	5307	8
DOT0424	RS	MLFD TD	Milford	Milford TD - Admin Capital/Misc Support FY 26	400,000	400,000	320,000	80,000	5307	8
DOT0412	EQ	NTD	Norwalk	Norwalk TD - Paratransit Vehicles FY 26	1,250,000	1,250,000	1,000,000	250,000	5307	1
DOT0412	RS	NTD	Norwalk	Norwalk TD - Admin Capital/Misc Support FY 26	500,000	500,000	400,000	100,000	5307	1
DOT00360199EQ	RS	VTD	Waterbury	NVCOG/VTD - Admin Capital/Misc Support FY 26	400,000	400,000	320,000	80,000	5307	5
DOT0416	EQ	HART	Danbury	HART -Paratransit Vehicles FY 26	800,000	800,000	640,000	160,000	5307	2
DOT0416	CN	HART	Danbury	HART Admin Capital/Misc Support FY 26	200,000	200,000	160,000	40,000	5307	2
DOT0416	RS	HART	Danbury	HART Operating Assitance FY 26	492,302	492,302	492,302	0	5307	2
DOT0414	CN	SEAT	Norwich	SEAT - Admin Capital/Misc Support FY 26	300,000	300,000	240,000	60,000	5307	13
DOT0478	EQ	Esutary TD	Centerbrook	Estuary TD - Admin Capital/Misc Support FY 26	400,000	400,000	320,000	80,000	5307	11/12
DOT01703438EQ	RS	VARIOUS	VARIOUS	Transit District Match Requirements	5,000,000	5,000,000	0	5,000,000	STATE	70
VARIOUS	CN	VARIOUS	VARIOUS	Transit District Facility Upgrades for Battery Electric Buses	3,000,000	3,000,000	2,400,000	600,000	5307	70

Updated 6/20/2022

2022-2026 Capital Plan - Transit
Overprogramming

PROJECT	ROUTE	TOWN	DESCRIPTION	TOTAL COST	YEAR	REGION
DOT03200012CN	Hartford Line	North Haven	Hartford Line North Haven Station	52,000,000	TBD	70
DOT03200013CN	Hartford Line	Newington	Hartford Line-Newington Station	52,000,000	TBD	70
DOT03200014CN	Hartford Line	West Hartford	Hartford Line-West Hartford Station	70,000,000	TBD	70
TBD	VARIOUS	VARIOUS	Electrification (Hartford Line, Waterbury Line, Danbury Line)	TBD	TBD	70

Updated 6/20/2022

Appendix F. TAPT Results

Program List: Prioritization Run Expected

Program Year	Asset ID Code	Description	No. of Assets	Replacement Costs	Project Rank	PI
2022	GBTA 2009 Toyota Camry	Service-Auto	2	69,152	6	1.3886
2022	HART 2009 Ford Escape	Service-SUV	2	114,961	5	1.3902
2022	GBTA 2010 GMC Terrain SLE	Service-SUV	1	57,480	8	1.2798
2022	GBTA 2014 Chevrolet Tahoe	Service-SUV	1	57,480	16	0.6550
2022	GBTA 2015 Chevrolet Tahoe	Service-SUV	2	114,961	18	0.4763
2022	NWLKTD 2016 Ford Explorer	Service-SUV	2	114,961	25	0.3028
2022	WRTD 2016 Jeep Patriot	Service-SUV	1	57,480	25	0.3028
2022	ETD 2011 Ford Escape	Service-SUV	1	57,480	10	1.1481
2022	VTD 2016 Ford Escape	Service-SUV	1	57,480	25	0.3028
2022	GBTA 1982 GMC TOW truck	Service-Truck	1	294,781	9	1.1530
2022	HART 1999 Ford Econoline	Service-Van	1	81,142	3	1.7168
2022	HART 2005 Ford E350	Service-Van	1	81,142	4	1.6461
2022	MAT 2014 Toyota Sienna LE minivan	Service-Van	1	81,142	15	0.6642
2022	SEAT 2015 Dodge Grand Caravan	Service-Van	1	81,142	17	0.4856
2022	ETD 6-2015 Ford E450 Phoenix	Cutaway Bus	1	171,251	20	0.4387
2022	GNHTD 7-2016 Ford Goshen E350	Cutaway Bus	4	685,005	32	0.2183
2022	GNHTD 9-2015 Ford E450 Goshen	Cutaway Bus	3	513,754	20	0.4387
2022	GNHTD 11-2013 Ford E450 Goshen	Cutaway Bus	1	171,251	11	0.9945
2022	HART 8-2016 Ford E350/Goshen Coach	Cutaway Bus	6	1,027,508	31	0.2183
2022	HART 9-2014 Ford E450/ Goshen Coach	Cutaway Bus	2	342,503	13	0.6954
2022	HART 12-2013 Ford E450/Goshen Coach	Cutaway Bus	2	342,503	11	0.9945
2022	MAT 4-2015 Goshen Coach E350	Cutaway Bus	7	1,198,759	19	0.4387
2022	NECTD 2-2010 Ford Startrans	Cutaway Bus	2	342,503	1	2.2246
2022	NWCTD 7-2012 Goshen Coach	Cutaway Bus	2	342,503	7	1.3433
2022	NWCTD 8-2011 Ford Startrans	Cutaway Bus	1	171,251	2	1.7500
2022	NWLKTD 7-2014 Chevrolet Pegasus	Cutaway Bus	10	1,712,513	13	0.6954
2022	SEAT 8-2016 Ford Phoenix E450	Cutaway Bus	5	856,256	32	0.2183
2022	HART Admin/Maint 1	Facility-Conveyance	1,228	1,227,510	23	0.3793
2022	NWLKTD Admin/Maint 1	Facility-Conveyance	1,068	1,068,453	23	0.3793
2022	MTD Admin/Maint 1	Facility-Equipment	2,078	2,077,691	30	0.2481
2022	NWLKTD Admin/Maint 1	Facility-Equipment	5,342	5,342,264	28	0.2481
2022	SEAT Admin/Maint 1	Facility-Equipment	3,216	3,215,732	28	0.2481
2022	MAT Parking 1	Facility-Equipment	352	351,829	22	0.3908
2023	HART 2017 Ford Explorer	Service-SUV	1	57,480	4	0.3028
2023	NWLKTD 2018 Nisan Murano	Service-SUV	2	114,961	26	0.1420
2023	MTD 2107 Nissan Pathfinder	Service-SUV	1	57,480	4	0.3028
2023	ETD 2017 Ford Escape	Service-SUV	1	57,480	4	0.3028
2023	ETD 2018 Ford Escape	Service-SUV	1	57,480	26	0.1420
2023	SEAT 2017 Ford Explorer	Service-SUV	3	172,441	4	0.3028
2023	GNHTD 2017 Ford Explorer	Service-SUV	4	229,921	4	0.3028
2023	GBTA 2003 GMC 4500Dump Truck	Service-Truck	1	294,781	9	0.2363
2023	GBTA 2009 GMC Sierra	Service-Truck	2	589,561	37	0.0488
2023	HART 2004 Ford F450	Service-Truck	1	294,781	24	0.2004

2023	MTD 2008 Ford F350	Service-Truck	1	294,781	34	0.0752
2023	ETD 2004 Trolley	Service-Truck	1	294,781	24	0.2004
2023	SEAT 2017 Dodge Caravan	Service-Van	1	81,142	3	0.3121
2023	GBTA 5-2017 Ford Startrans	Cutaway Bus	24	4,110,031	10	0.2183
2023	GBTA 6-2017 Dodge Braun	Cutaway Bus	2	342,503	14	0.2183
2023	GBTA 13-2003 New Flyer D35LF	Transit Bus	1	1,100,000	29	0.1165
2023	GNHTD 4-2017 Ford Startrans Senator II	Cutaway Bus	5	856,256	14	0.2183
2023	GNHTD 5-2017 Ford Goshen E350	Cutaway Bus	29	4,966,287	10	0.2183
2023	GNHTD 6-2017 Ford E450	Cutaway Bus	2	342,503	14	0.2183
2023	GNHTD 8-2016 Dodge Caravan	Van	2	126,504	35	0.0719
2023	GNHTD 10-2015 Dodge Caravan	Van	4	253,008	28	0.1187
2023	HART 4-2017 Ford Stratrans E450	Cutaway Bus	2	342,503	14	0.2183
2023	HART 5-2017 Ford Stratrans E350	Cutaway Bus	4	685,005	14	0.2183
2023	HART 7-2016 Ford E450/Goshen Coach	Cutaway Bus	1	171,251	1	0.4387
2023	MAT 2-2017 Ford E450	Cutaway Bus	1	171,251	14	0.2183
2023	MTD 3-2017 Ford Startrans E450	Cutaway Bus	3	513,754	10	0.2183
2023	MTD 4-2016 Ford E450	Cutaway Bus	8	1,370,010	1	0.4387
2023	NWCTD 5-2017 Ford E450	Cutaway Bus	3	513,754	10	0.2183
2023	NWCTD 6-2017 Dodge Grand Caravan	Van	1	63,252	39	0.0359
2023	NWLKTD 5-2017 Ford E450 Phoenix	Cutaway Bus	16	2,740,020	14	0.2183
2023	WRTD 6-2017 Ford Startrans E450	Cutaway Bus	2	342,503	14	0.2183
2023	WRTD 7-2017 Ford Startrans E350	Cutaway Bus	4	685,005	14	0.2183
2023	WRTD 8-2017 Ford E450	Cutaway Bus	1	171,251	14	0.2183
2023	WRTD 9-2006 Gillig	Transit Bus	1	1,100,000	36	0.0680
2023	WRTD 10-2008 Gillig	Transit Bus	1	1,100,000	38	0.0406
2023	MAT Parking 1	Facility-Shell	369	369,420	33	0.0884
2023	MTD Admin/Maint 1	Facility-HVAC	935	934,961	30	0.0963
2023	NWLKTD Admin/Maint 1	Facility-HVAC	2,404	2,404,019	32	0.0963
2023	MAT Parking 1	Facility-HVAC	158	158,323	30	0.0963
2024	GNHTD 2-2018 Ford Startrans Senator II	Cutaway Bus	6	1,027,508	1	0.2183
2024	GNHTD 3-2018 Ford E350	Cutaway Bus	6	1,027,508	1	0.2183
2024	MAT 1-2018 Ford E450	Cutaway Bus	1	171,251	6	0.2183
2024	NWCTD 3-2018 Ford E350	Cutaway Bus	3	513,754	1	0.2183
2024	NWCTD 4-2018 Ford E450	Cutaway Bus	1	171,251	6	0.2183
2024	NWLKTD 4-2018 Ford E450 Phornix	Cutaway Bus	9	1,541,262	1	0.2183
2024	VTD 1-2018 Ford Supreme	Cutaway Bus	14	2,397,518	1	0.2183
2024	GBTA Maint 1	Facility-Equipment	8,212	8,212,218	8	0.0314
2024	GNHTD Admin/Maint 1	Facility-Equipment	1,219	1,218,520	8	0.0314
2025	MAT 2020 Ford Escape SE AWD	Service-SUV	1	57,480	7	0.1420
2025	VTD 2020 Ford Explorer XLT	Service-SUV	1	57,480	7	0.1420
2025	SEAT 2020 Ford Transit minivan	Service-Van	2	162,284	6	0.1514
2025	ETD 3-2019 Ford E-450 Phoenix 25'	Cutaway Bus	3	513,754	1	0.2183
2025	ETD 5-2019 Ford E-450 Phoenix 22'	Cutaway Bus	7	1,198,759	1	0.2183
2025	GNHTD 1-2019 Ford Startrans Senator II	Cutaway Bus	24	4,110,031	1	0.2183
2025	MTD 5-2010 New Flyer D40LF	Transit Bus	2	2,200,000	15	0.0406
2025	NECTD 1-2019 Ford Startrans Senator E350	Cutaway Bus	8	1,370,010	4	0.2183
2025	SEAT 4-2019 Ford Startrans Senator	Cutaway Bus	2	342,503	4	0.2183
2025	GBTA Admin 1	Facility-Conveyance	346	345,778	13	0.0945

2025	GNHTD Admin/Maint 1	Facility-Conveyance	244	243,704	13	0.0945
2025	HART Passenger Facility 1	Facility-Conveyance	10	9,509	12	0.0945
2025	GBTA Admin 1	Facility-Equipment	1,729	1,728,888	9	0.1141
2025	HART Admin/Maint 1	Facility-Equipment	6,138	6,137,552	9	0.1141
2025	HART Passenger Facility 1	Facility-Equipment	48	47,544	11	0.1141

Program List: Prioritization Run SGR

Program Year	Asset ID Code	Description	No. of Assets	Replacement Costs	Project Rank	PI
2022	GBTA 2009 Toyota Camry	Service-Auto	2	69,152	6	1.3886
2022	HART 2009 Ford Escape	Service-SUV	2	114,961	5	1.3902
2022	HART 2017 Ford Explorer	Service-SUV	1	57,480	40	0.1420
2022	GBTA 2010 GMC Terrain SLE	Service-SUV	1	57,480	8	1.2798
2022	GBTA 2014 Chevrolet Tahoe	Service-SUV	1	57,480	16	0.6550
2022	GBTA 2015 Chevrolet Tahoe	Service-SUV	2	114,961	18	0.4763
2022	NWLKTD 2016 Ford Explorer	Service-SUV	2	114,961	25	0.3028
2022	MTD 2107 Nissan Pathfinder	Service-SUV	1	57,480	40	0.1420
2022	WRTD 2016 Jeep Patriot	Service-SUV	1	57,480	25	0.3028
2022	ETD 2011 Ford Escape	Service-SUV	1	57,480	10	1.1481
2022	ETD 2017 Ford Escape	Service-SUV	1	57,480	40	0.1420
2022	SEAT 2017 Ford Explorer	Service-SUV	3	172,441	40	0.1420
2022	GNHTD 2017 Ford Explorer	Service-SUV	4	229,921	40	0.1420
2022	VTD 2016 Ford Escape	Service-SUV	1	57,480	25	0.3028
2022	GBTA 1982 GMC TOW truck	Service-Truck	1	294,781	9	1.1530
2022	GBTA 2003 GMC 4500Dump Truck	Service-Truck	1	294,781	36	0.2004
2022	HART 2004 Ford F450	Service-Truck	1	294,781	37	0.1662
2022	ETD 2004 Trolley	Service-Truck	1	294,781	37	0.1662
2022	HART 1999 Ford Econoline	Service-Van	1	81,142	3	1.7168
2022	HART 2005 Ford E350	Service-Van	1	81,142	4	1.6461
2022	MAT 2014 Toyota Sienna LE minivan	Service-Van	1	81,142	15	0.6642
2022	SEAT 2015 Dodge Grand Caravan	Service-Van	1	81,142	17	0.4856
2022	SEAT 2017 Dodge Caravan	Service-Van	1	81,142	39	0.1514
2022	ETD 6-2015 Ford E450 Phoenix	Cutaway Bus	1	171,251	20	0.4387
2022	GBTA 13-2003 New Flyer D35LF	Transit Bus	1	1,100,000	45	0.1002
2022	GNHTD 7-2016 Ford Goshen E350	Cutaway Bus	4	685,005	32	0.2183
2022	GNHTD 9-2015 Ford E450 Goshen	Cutaway Bus	3	513,754	20	0.4387
2022	GNHTD 11-2013 Ford E450 Goshen	Cutaway Bus	1	171,251	11	0.9945
2022	HART 7-2016 Ford E450/Goshen Coach	Cutaway Bus	1	171,251	32	0.2183
2022	HART 8-2016 Ford E350/Goshen Coach	Cutaway Bus	6	1,027,508	31	0.2183
2022	HART 9-2014 Ford E450/ Goshen Coach	Cutaway Bus	2	342,503	13	0.6954
2022	HART 12-2013 Ford E450/Goshen Coach	Cutaway Bus	2	342,503	11	0.9945
2022	MAT 4-2015 Goshen Coach E350	Cutaway Bus	7	1,198,759	19	0.4387
2022	MTD 4-2016 Ford E450	Cutaway Bus	8	1,370,010	32	0.2183
2022	NECTD 2-2010 Ford Startrans	Cutaway Bus	2	342,503	1	2.2246
2022	NWCTD 7-2012 Goshen Coach	Cutaway Bus	2	342,503	7	1.3433
2022	NWCTD 8-2011 Ford Startrans	Cutaway Bus	1	171,251	2	1.7500
2022	NWLKTD 7-2014 Chevrolet Pegasus	Cutaway Bus	10	1,712,513	13	0.6954
2022	SEAT 8-2016 Ford Phoenix E450	Cutaway Bus	5	856,256	32	0.2183
2022	HART Admin/Maint 1	Facility-Conveyance	1,228	1,227,510	23	0.3793
2022	NWLKTD Admin/Maint 1	Facility-Conveyance	1,068	1,068,453	23	0.3793
2022	NWLKTD Admin/Maint 1	Facility-HVAC	2,404	2,404,019	46	0.0781
2022	MAT Parking 1	Facility-HVAC	158	158,323	46	0.0781
2022	MTD Admin/Maint 1	Facility-Equipment	2,078	2,077,691	30	0.2481

2022	NWLKTD Admin/Maint 1	Facility-Equipment	5,342	5,342,264	28	0.2481
2022	SEAT Admin/Maint 1	Facility-Equipment	3,216	3,215,732	28	0.2481
2022	MAT Parking 1	Facility-Equipment	352	351,829	22	0.3908
2023	NWLKTD 2018 Nisan Murano	Service-SUV	2	114,961	15	0.1420
2023	ETD 2018 Ford Escape	Service-SUV	1	57,480	15	0.1420
2023	GBTA 2009 GMC Sierra	Service-Truck	2	589,561	23	0.0488
2023	MTD 2008 Ford F350	Service-Truck	1	294,781	20	0.0752
2023	GBTA 5-2017 Ford Startrans	Cutaway Bus	24	4,110,031	1	0.2183
2023	GBTA 6-2017 Dodge Braun	Cutaway Bus	2	342,503	5	0.2183
2023	GNHTD 2-2018 Ford Startrans Senator II	Cutaway Bus	6	1,027,508	26	0.0290
2023	GNHTD 3-2018 Ford E350	Cutaway Bus	6	1,027,508	26	0.0290
2023	GNHTD 4-2017 Ford Startrans Senator II	Cutaway Bus	5	856,256	5	0.2183
2023	GNHTD 5-2017 Ford Goshen E350	Cutaway Bus	29	4,966,287	1	0.2183
2023	GNHTD 6-2017 Ford E450	Cutaway Bus	2	342,503	5	0.2183
2023	GNHTD 8-2016 Dodge Caravan	Van	2	126,504	21	0.0719
2023	GNHTD 10-2015 Dodge Caravan	Van	4	253,008	17	0.1187
2023	HART 4-2017 Ford Stratrans E450	Cutaway Bus	2	342,503	5	0.2183
2023	HART 5-2017 Ford Stratrans E350	Cutaway Bus	4	685,005	5	0.2183
2023	MAT 1-2018 Ford E450	Cutaway Bus	1	171,251	26	0.0290
2023	MAT 2-2017 Ford E450	Cutaway Bus	1	171,251	5	0.2183
2023	MTD 3-2017 Ford Startrans E450	Cutaway Bus	3	513,754	1	0.2183
2023	NWCTD 3-2018 Ford E350	Cutaway Bus	3	513,754	26	0.0290
2023	NWCTD 4-2018 Ford E450	Cutaway Bus	1	171,251	26	0.0290
2023	NWCTD 5-2017 Ford E450	Cutaway Bus	3	513,754	1	0.2183
2023	NWCTD 6-2017 Dodge Grand Caravan	Van	1	63,252	25	0.0359
2023	NWLKTD 4-2018 Ford E450 Phornix	Cutaway Bus	9	1,541,262	26	0.0290
2023	NWLKTD 5-2017 Ford E450 Phoenix	Cutaway Bus	16	2,740,020	5	0.2183
2023	VTD 1-2018 Ford Supreme	Cutaway Bus	14	2,397,518	26	0.0290
2023	WRTD 6-2017 Ford Startrans E450	Cutaway Bus	2	342,503	5	0.2183
2023	WRTD 7-2017 Ford Startrans E350	Cutaway Bus	4	685,005	5	0.2183
2023	WRTD 8-2017 Ford E450	Cutaway Bus	1	171,251	5	0.2183
2023	WRTD 9-2006 Gillig	Transit Bus	1	1,100,000	22	0.0680
2023	WRTD 10-2008 Gillig	Transit Bus	1	1,100,000	24	0.0406
2023	MAT Parking 1	Facility-Shell	369	369,420	19	0.0884
2023	MTD Admin/Maint 1	Facility-HVAC	935	934,961	18	0.0963
2024	ETD 3-2019 Ford E-450 Phoenix 25'	Cutaway Bus	3	513,754	6	0.0290
2024	ETD 5-2019 Ford E-450 Phoenix 22'	Cutaway Bus	7	1,198,759	6	0.0290
2024	GNHTD 1-2019 Ford Startrans Senator II	Cutaway Bus	24	4,110,031	6	0.0290
2024	MTD 5-2010 New Flyer D40LF	Transit Bus	2	2,200,000	11	0.0281
2024	NECTD 1-2019 Ford Startrans Senator E350	Cutaway Bus	8	1,370,010	6	0.0290
2024	NWLKTD 9-2010 Gillig Low Floor 29'	Transit Bus	4	4,400,000	11	0.0281
2024	SEAT 4-2019 Ford Startrans Senator	Cutaway Bus	2	342,503	6	0.0290
2024	GBTA Admin 1	Facility-Equipment	1,729	1,728,888	1	0.0314
2024	GBTA Maint 1	Facility-Equipment	8,212	8,212,218	1	0.0314
2024	HART Admin/Maint 1	Facility-Equipment	6,138	6,137,552	1	0.0314
2024	GNHTD Admin/Maint 1	Facility-Equipment	1,219	1,218,520	1	0.0314
2024	HART Passenger Facility 1	Facility-Equipment	48	47,544	1	0.0314

2025	MAT 2020 Ford Escape SE AWD	Service-SUV	1	57,480	2	0.1420
2025	VTD 2020 Ford Explorer XLT	Service-SUV	1	57,480	2	0.1420
2025	HART 2012 Ford F250	Service-Truck	1	294,781	10	0.0244
2025	SEAT 2020 Ford Transit minivan	Service-Van	2	162,284	1	0.1514
2025	ETD 2-2020 Ford Startrans - Transit	Cutaway Bus	3	513,754	7	0.0290
2025	GBTA 7-2012 Gillig Phantom	Transit Bus	3	3,300,000	11	0.0165
2025	GBTA 8-2012 Gillig Phantom	Transit Bus	3	3,300,000	11	0.0165
2025	GBTA 9-2012 Gillig Phantom	Transit Bus	3	3,300,000	11	0.0165
2025	GBTA 10-2012 Gillig Phantom	Transit Bus	3	3,300,000	11	0.0165
2025	GBTA 11-2012 Gillig Phantom	Transit Bus	3	3,300,000	11	0.0165
2025	GBTA 12-2011 New Flyer Hybrid	Transit Bus	2	2,200,000	9	0.0281
2025	MAT 6-2012 Gillig low floor 30'	Transit Bus	3	3,300,000	11	0.0165
2025	NWCTD 2-2020 Ford E350	Cutaway Bus	1	171,251	7	0.0290
2025	SEAT 9-2013 Gillig Hybrid 35'	Transit Bus	1	1,100,000	17	0.0056
2025	SEAT 10-2013 Gillig Hybrid 40'	Transit Bus	1	1,100,000	17	0.0056
2025	GBTA Admin 1	Facility-Conveyance	346	345,778	5	0.0945
2025	GNHTD Admin/Maint 1	Facility-Conveyance	244	243,704	5	0.0945
2025	HART Passenger Facility 1	Facility-Conveyance	10	9,509	4	0.0945

Appendix G. Performance Projections Data

Vehicles - % of vehicles met or exceeded ULB

Transit Bus	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	5.2%	5.2%	4.7%	15.1%	15.1%
No Funding	5.2%	5.2%	6.4%	16.9%	18.0%
Achieve SGR	5.2%	4.7%	4.7%	11.6%	0.0%
Target	14.0%	14.0%	14.0%	14.0%	14.0%

Cutaway Bus	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	56.6%	39.6%	14.8%	16.3%	1.5%
No Funding	56.6%	56.7%	71.5%	87.8%	89.3%
Achieve SGR	56.6%	36.3%	0.0%	0.0%	0.0%
Target	17.0%	17.0%	17.0%	17.0%	17.0%

Minivan	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	100.0%	100.0%	0.0%	0.0%	0.0%
No Funding	100.0%	100.0%	100.0%	100.0%	100.0%
Achieve SGR	100.0%	100.0%	0.0%	0.0%	0.0%
Target	17.0%	17.0%	17.0%	17.0%	17.0%

Truck	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	21.7%	26.1%	0.0%	4.3%	4.3%
No Funding	21.7%	30.4%	30.4%	34.8%	34.8%
Achieve SGR	21.7%	13.0%	0.0%	4.3%	0.0%
Target	7.0%	7.0%	7.0%	7.0%	7.0%

Automobile	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	100.0%	0.0%	0.0%	0.0%	0.0%
No Funding	100.0%	100.0%	100.0%	100.0%	100.0%
Achieve SGR	100.0%	0.0%	0.0%	0.0%	0.0%
Target	17.0%	17.0%	17.0%	17.0%	17.0%

SUV	**Current**	**Projected**			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	80.8%	50.0%	0.0%	7.7%	0.0%
No Funding	80.8%	92.3%	92.3%	100.0%	100.0%
Achieve SGR	80.8%	11.5%	0.0%	7.7%	0.0%
Target	17.0%	17.0%	17.0%	17.0%	17.0%

Van	**Current**	**Projected**			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	71.4%	14.3%	0.0%	28.6%	0.0%
No Funding	71.4%	71.4%	71.4%	100.0%	100.0%
Achieve SGR	71.4%	0.0%	0.0%	28.6%	0.0%
Target	17.0%	17.0%	17.0%	17.0%	17.0%

Facilities - % of components rated below 3

Admin/Maint	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	6.5%	12.1%	3.4%	0.0%	0.0%
No Funding	6.5%	12.1%	12.1%	12.1%	12.1%
Achieve SGR	6.5%	12.1%	1.7%	0.0%	0.0%
Target	0.0%	0.0%	0.0%	0.0%	0.0%

Passenger	Current	Projected			
Year	**2021**	**2022**	**2023**	**2024**	**2025**
Expected Funding	6.1%	6.0%	4.0%	0.0%	0.0%
No Funding	6.1%	6.0%	6.0%	6.0%	6.0%
Achieve SGR	6.1%	6.0%	2.0%	0.0%	0.0%
Target	0.0%	0.0%	0.0%	0.0%	0.0%